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DEPARTMENT OF AGRICULTURE
OTTAWA, CANADA.

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The Agricultural Gazette
of Canada

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TABLE OF CONTENTS

52442—1½

PART IV

SPECIAL CONTRIBUTIONS, REPORTS OF AGRICULTURAL ORGANIZATIONS, PUBLICATIONS, AND NOTES

PART V

THE INTERNATIONAL INSTITUTE OF AGRICULTURE.

The Agricultural Gazette

OF CANADA

VOL. VI JANUARY, 1919 No. 1

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TRAINING SCHOOL GIRLS FOR DOMESTIC PROFICIENCY.

THE framers of The Agricultural Instruction Act had a further object than the development of proficiency in the art of agriculture. Better crops, improving live stock and greater prosperity for the rural community were but incidental to the achievements looked for from the work to be accomplished with the ten millions of dollars placed at the disposal of the provinces to be devoted to rural instruction during the ten years ending on March 31st, 1923.

The development of a rural citizenship was the ultimate aim and on this depends not only a bettered economic condition in so far as the activities of men are concerned but a womanhood better equipped to fulfil the destinies that belong to her. In apportioning the grants each year the needs of the whole range of the rural population have been kept in mind not in the direction of providing special institutions but in expanding and adjusting the available working force and equipment so as to meet effectually the needs of the present day rural life.

Until federal assistance was afforded for rural education household science instruction was considered quite outside the range of the country school and it has taken time to convince the educational heads that there is room in the already crowded curriculum for this very practical subject. The progress made has not been uniform over Canada, indeed one western province has gone quite in advance of the other parts of the Dominion in dealing effectively with the question. Other provinces are working out ambitious plans and it will not be long before our farm-raised girls will leave the rural school not only informed on proper methods in home-making, and all that it implies, but inspired as never before with the responsibilities that will devolve upon woman in her domestic sphere in the readjustment period and afterwards. The commendable progress being made by Ontario in developing household science instruction in the rural school with Agricultural Instruction Act appropriations, was shown in THE AGRICULTURAL GAZETTE of August last. In this number, in Part III, six of the other provinces reveal the plans they have under way for the training of country maidens for domestic proficiency.

THE LIVE STOCK SITUATION

BY H. B. THOMSON, CHAIRMAN, CANADA FOOD BOARD

EIGHT countries in Europe alone show an ascertainable decrease of 50,000,000 head of cattle, sheep, and pigs since war broke out. These figures do not take into consideration the complete wiping out of all stocks down to chickens in Belgium, Serbia, Roumania, and the many small republics that have sprung up along the old German-Russian frontier. It is safe to assume that at least another 50,000,000 head have disappeared from these lands.

A recent calculation showed the probable decrease throughout Europe, compared with pre-war conditions, to be:—

Cattle	28,000,000
Sheep	54,500,000
Swine	32,500,000
Total	115,000,000

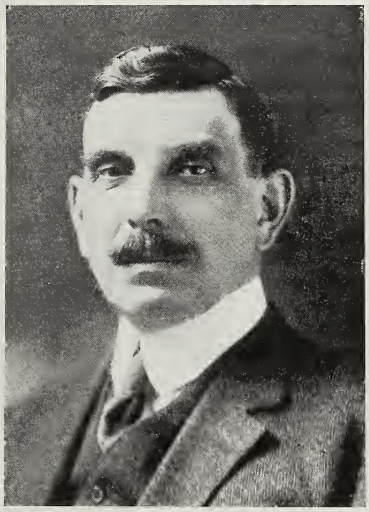
Yet in this, there is not even a guess as to the ruin wrought in Turkey, Bulgaria, and among the small peoples of Asia Minor, right away from the Dardanelles to the Caucasian Mountains, and down through Palestine and along the Mesopotamia waters to the Persian Gulf.

Decreases which have been made public by the Inter-Allied Food Commission since the signing of the last armistice are:—

Country.	Pre-war Total.	Decrease.
	Cattle.	Cattle.
France	14,787,600	2,366,000
Italy	6,646,000	996,000
Denmark	2,462,800	344,700
Sweden	2,722,500	598,900
Holland	2,096,500	.....
Germany	21,828,000	2,182,800
Austria	9,160,000	.....
Hungary	6,028,000	.....
	Sheep.	Sheep.
United Kingdom	27,886,000	2,788,600
France	16,131,000	2,258,300
Italy	13,824,000	138,000
Denmark	514,000	46,200
Sweden	973,400	.....
Holland	842,000	199,900
Germany	5,471,000	.....
Austria	2,428,000	.....
Hungary	7,696,000	.....
	Pigs.	Pigs.
United Kingdom	3,939,000	984,200
France	7,035,000	2,814,000
Italy	2,722,000	353,800
Denmark	2,496,700	1,872,300
Sweden	977,600	351,900
Holland	1,350,000	162,000
Germany	25,341,000	19,305,750
Austria	6,432,000	.....
Hungary	6,415,000	.....

This, then, is the need in the Trans-Atlantic world.

What of Canada's ability to supply these grave and pressing deficiencies in live stock? If our farmers will take the matter up seriously, they have a golden chance. Sir William Goode, of the British Ministry of Food, cabled the Canada Food Board late in December that there would be an insistent demand in



H. B. THOMSON, CHAIRMAN CANADA FOOD BOARD

Great Britain for overseas supplies; that, owing to the universal reduction of pigs, the world production of bacon, hams, pork, and lard was unequal to the demand, and that the milk yield was almost at a vanishing point in Central Europe, Holland, Switzerland, and Scandinavia, countries which were normally large exporters of dairy produce. The number of cattle, sheep and pigs in Canada has increased since June, 1914. In fact, the number of cattle has risen from 6,036,000 to 7,920,000.

Farmers should not forget that Canada before the war annually produced one-sixteenth of the world's supply of wheat. That shows us the relative size of the market, and is a measure by which our live stock men can gauge their own opening. But in live stock the Dominion lags far behind. It has hitherto only produced enough to feed its own population. Mexico, with a population not quite twice that of the Dominion, annually exports four and a half times as many cattle. Argentina, farther away from European markets, and hampered by a 7,000 mile ocean route across the Equator, and with a smaller population than Canada, exports five times as much mutton, and four hundred times as much beef. Denmark, with a population of less than 3,000,000 people, with an area of only 15,300 square miles, i.e., about one-half the size of New Brunswick and about one-eighteenth the size of Alberta, annually exports four times as much pork products as does the Dominion. But when we come to Australia shipping 3,000 times as much mutton, and little New Zealand shipping 4,000 times as much, our Dominion trade seems to fade out of sight.

These considerations should be enough to show that our Canadian live stock development has only just begun.

PART I

Dominion Department of Agriculture

THE DOMINION EXPERIMENTAL FARMS

THE DIVISION OF CHEMISTRY

THE "ALKALI" CONTENT OF SOILS AS RELATED TO CROP GROWTH*

BY FRANK T. SHUTT, M.A., D.SC., AND E. A. SMITH, M.A.

THE nature, concentration, and distribution of alkali as occurring in soils of certain semi-arid districts of Western Canada, have been studied during the past five years in the laboratories of the Experimental Farm system. The work has included the analysis of several hundreds of soil groups collected chiefly in tracts about to be placed under irrigation in Southern Alberta. The data so obtained have materially assisted the Government in the classification of the areas in question into irrigable and non-irrigable lands. For the purpose of applying these data, American standards as regards safe limits of alkali have largely been used. The results presented in this paper are a contribution towards the establishment of standards more particularly adapted to Canadian conditions.

THE NATURE AND FORMATION OF SOILS IN GENERAL

Arable soils are made up of two great classes of constituents: (1) mineral, as derived from the disintegration and partial decomposition of rock material; and (2) vegetable matter, the semi-decomposed remains of past generations of plant life, commonly known as humus. It is from the former that the stores of lime, phosphoric acid, potash, etc., present in the soil are furnished, while the latter supplies the nitrogen required for crop growth and at the same time acts as an important factor in supporting bacterial life and in regulating the temperature, the moisture-content and the aeration of the soil.

Soil formation is not merely a matter of the past; it is now going on. Under natural conditions, as in the forests, our soils are being constantly enriched in humus from decaying roots, fallen leaves—from the death and decay of vegetation generally, and, further, by physical changes and chemical reactions, favoured by warmth, moisture, carbonic acid of the atmosphere, etc., the rock elements of the soil are being continually, though slowly, desintegrated and decomposed, giving rise to soluble mineral compounds, some of which may be useful and others injurious to plant life.

THE FORMATION OF ALKALI

In humid districts, i.e., those enjoying a more or less generous rainfall, the mineral salts formed by these processes, known popularly as "weathering", are practically disposed of as produced. In part they are utilized by vegetation, and any remaining injurious salts leach downwards and drain away; the conditions are such that there can be no accumulation of them in the surface soil.

*Read before Chemistry and Physics Section Royal Society, May, 1918.

But such is not always or necessarily the case in arid or semi-arid districts. Here we find the scanty rainfall, while sufficient to promote the formation of these soluble mineral salts, quite inadequate to their removal by drainage. If they descend a few inches, or even a few feet, there is not enough flow of water through the soil to carry them right away and, subsequent evaporation of the water that holds them in solution, and the action of capillarity brings them to the surface, where they accumulate, forming the so-called alkali, and rendering the soil more or less unsuitable for agricultural purposes. The alkali may impregnate the subsoil, the surface soil, or if evaporation greatly exceeds the rainfall, it may appear as an incrustation or efflorescence.

Alkali soils, therefore, are characteristic of arid or semi-arid districts only, and these in Canada may be said to be restricted chiefly to certain areas in British Columbia, Southern Alberta, and Southwestern Saskatchewan.

NATURE OF "ALKALI"

The compounds known collectively as alkali comprise chiefly sodium sulphate, sodium carbonate, sodium chloride, magnesium sulphate, calcium sulphate (gypsum) when present in large quantities, and occasionally chlorides of calcium and magnesium. Sulphate and chloride of sodium and sulphate of magnesium and calcium when crystallized on the surface of the soil, appear as white substances, and constitute what is known as "white alkali". "Black alkali" is characterized by the presence of sodium carbonate, though this compound is almost always associated with one or more of the sulphates mentioned above. Sodium carbonate is, as is well known, white, but from the fact that it acts upon and dissolves the decayed vegetable matter (humus) of the soil the incrustation is dark brown or black. Hence the name. Water standing in pools on soils impregnated with sodium carbonate is invariably of a dark colour resembling a strong infusion of coffee.

EFFECTS OF ALKALI ON PLANTS

The soil water of lands impregnated with alkali is a more or less concentrated solution of these compounds. It is the soil moisture which assists in the germination of the seed and is the means of conveying food to the plant rootlets; for the performance of these important functions it is obvious that it should possess no injurious properties. The effect of a solution such as we find in alkali soils on the cells in the tissues of the roots is to extract or withdraw from them by osmosis their natural water. As a result the cells lose their turgidity, their protoplasmic contents shrink from the cell wall, the plant wilts, and death may ensue. The higher the percentage of alkali—in other words, the more concentrated the solution—the more severe the effect in this direction. Chlorides are more injurious than sulphates.

"Black" alkali is much more injurious than "white" alkali. The sodium carbonate it contains is directly corrosive, causing injury at the base of the trunk or root crown of the plant, by cutting into and eating away the tissues. The bark of green herbaceous stems is usually turned to a brownish tinge for half an inch or more immediately above the surface of the ground so as to be coming soft and easily peeling off. The rough bark of trees is found to be almost black, and the green layer underneath brown. Very small quantities are sufficient to prevent seed germination, or to destroy the tender rootlets of the seedling, if the young plant appears.

All kinds of alkali have a tendency to destroy a soil's tilth, but this is particularly marked in the case of black alkali. The soil readily puddles, flocculation, or the property of forming flakes, is destroyed and the land becomes in a large degree

impervious to water. On drying hard refractory masses are formed and the soil is extremely difficult to work. Very frequently a hard, practically an impenetrable hardpan forms under such soils, making it almost impossible to put in a system of tile sub-drainage.

Crops differ greatly in their susceptibility to alkali; some are so resistant that they may thrive and come to maturity on soils, that for the majority of farm crops there can be no possible hope of success. Apart however, from th s question of relative resistancy of crops, the composition, concentration and vertical distribution of the a kali and the physical character of the soil are all important matters in reaching a conclusion as to the desirability and safety of placing an affected area under irrigation. Injudicious or excessive application of irrigation water to soils impregnated with alkali, expecially if the subsoil is of an impervious character and subdrainage is not provided, may ruin by bringing up alkali what would otherwise be excellent land for cultivation under dry farming methods. The irrigation of impregnated land without efficient drainage—natural or artificial—almost invariably gives rise to "rise of alkali" and this—in the past has been a fruitful cause of the ruination in the Western States of large areas of once cultivable, fertile soil.

LIMITS OF TOXICITY

The present paper records the results of the analysis of five series of soil groups, each series consisting of three groups representative of land upon which (1) there was fair or good growth, the concentration of the alkali, if present, being apparently and for practical purposes negligible, (2) there was poor growth, the crop evidently being distressed by, alkali and (3) there was no growth due to excess of alkali. Each series represents a separate tract of land (or field), the three groups being frequently collected within a short distance of one another. As in all our work in connection with the Irrigation tracts each group consisted of five samples: A 0′.0–0′.5′, B 0′–.5 – 1′.5, C 1′ .5–3′ .0 and D 3′ .0–5′ .0.

WESTERN RYE GRASS

Series 1.—Sec. 20, Tp. 9, R. 27, W. of 3rd Meridian.

Field of Western Rye grass about 18 miles southwest of Maple Creek, Sask. The land had been under irrigation for 6 years, during which time the bare alkali spots or patches had increased in size very considerably. Had been sown to wheat 1910, oats 1911, and seeded to Western Rye grass. Crop at time of visit, July 4, 1917, was only fair on better parts of field, the plants being from 4 to 6 inches in height Soil a dark brown almost black moderately light loam, of good quality; subsoil of heavier character, a dark grey to yellow grey clay with a little sand. Water table, from 3 to 5 feet, according to contour of land. One group of samples taken from a bare spot, the second in sparse and meagre growth, about 15 feet distant, and the third in the best growth, about 80 feet from the same point of collection.

WESTERN RYE GRASS

Series I. Sec. 20, Tp. 9, Rg. 27, W. of 3rd Meridian.

Group No.	Depth	Growth	Na_2SO_3	$MgSO_4$	$CaSO_4$	Total soluble Saline content
1603	0′·0—0′·5		·089			·128
	0′·5—1′·5	Fair	·073			·120
	1′·5—3′·0	to	·085			·168
	3′·0—5′·0	Good	·641	·504	1·307	2·436
1602	"	Poor	·117			·152
			·254			·300
			·618			·770
			·980	·580	1·376	3·016
1601	"	No	1·109	·279	·233	1·748
			1·033	·309	·272	1·656
			·964	·066	·104	1·200
			1·189	·210	·304	1·756

Discussion of Results.—The impregnation is white alkali, the chief constituent being sodium sulphate. Magnesium sulphate is present in certain of the members, but chlorides are absent, save in traces, throughout the series. In samples D (3′·0-5′·0) of two of the groups calcium sulphate is present in considerable amounts. This compound cannot properly be classed as alkali, though it is somewhat open to question if it is altogether inert towards growing vegetation when present in amounts approaching 1 per cent.

Group 1603. Fair to good growth. The sodium sulphate content is very low, and practically uniform to a depth of 3′·0, the amount in A.B. and C being less than ·1 per cent, which is usually regarded as negligible.*

In D (3′·0-5′·0) there is a serious increase of this salt, to ·641 per cent, accompanied by ·504 per cent magnesium sulphate. It is doubtful, if at this depth, this alkali markedly affects the grass crop; the danger of its presence lies in the possibility of its rise by irrigation.

Group 1602. Meagre and distressed growth. The percentages of sodium sulphate are considerably higher than in the corresponding members of the preceding group, ranging from ·117 per cent to ·980 per cent, the increase being steady and marked from A (0′·0-0′·5) to D (3′·0-5′·0).

Judging from the sparse and meagre appearance of the crop we might conclude that in this group we closely approach, for Western Rye grass, the limits for tolerance.

Group 1601. No growth. Soil bare. The percentages of sodium sulphate throughout closely approximate 1·0, the concentration being fairly uniform from the surface to the depth of 5 feet. Notable amounts of magnesium sulphate are present in all the members of this group, save C (1′·5-3′·0).

The alkali impregnation of this group far exceeds the extreme limit of tolerance for ordinary farm crops.

NATIVE PRAIRIE GRASS

Series II. Sec. 9, Tp. 11, R. 25, W. of 3rd Meridian.

From irrigated field 7 miles southeast of Maple Creek, Sask. The land had been under irrigation for a number of years, but had never been

*Less than 2 per cent sodium sulphate, unless concentrated in the first foot, is regarded by most American authorities as not injuriously affecting ordinary farm crops.

cultivated, the native grass being cut and cured as hay. The surface soil was a fairly good sandy loam, the sub-soil of heavier nature, containing a considerable proportion of clay. In the best parts of the field the grass was of good growth. Samples collected July 6th, 1917.

NATIVE PRAIRIE GRASS

Series II. Sec. 9, Tp. 11, R. 25, W. of 3rd Meridian.

Group No.	Depth	Growth	Na_2S_2O	$MgSO_4$	$CaSO_4$	Total Soluble Saline Content
1606.....	0′·0—0′·5	Good	·070	.....	.....	·136
	0′·5—1′·5		·641	·104	·128	·916
	1′·5—3′·0		·731	·109	·109	·960
	3′·0—5′·0		·541	·185	·136	·864
1605.....	"	Poor	·432	.....	·110	·584
			1·001	·272	·136	1·428
			·765	.....	·066	·920
			1·662	.....	·825	2·696
1604.....	0′·0—0′·5	No	2·407	·578	.....	3·108
	0′·5—1′·5		2·175	·501	·216	2·768
	1′·5—2′·8		2·454	·378	·527	3·360

Discussion of Results.—In this, as in Series I, the alkali is chiefly sodium sulphate, but magnesium sulphate is also present in notable amounts, especially in Group 1604, characterized by "no growth."

Group 1606. Good growth. The sodium sulphate in A (0′·0-0′ ·5) is present in negligible amounts, but in the lower members of this group it reaches percentages ranging from ·541 (in D) to ·731 (in C), accompanied by small amounts of magnesium sulphate.

It might be inferred from these facts that provided the alkali in the first 6 inches of soil were negligible and that it did not exceed 0·7 per cent from 1′·5-5′ 0, that native prairie grass might be expected to make a good growth, without any marked distress.

Group 1605. Poor and meagre growth. The concentration of sodium sulphate in A (0′·0-0′·5) is 0·432 per cent, but increases markedly in the lower members of that group, amounting to 1·662 per cent in D.

This distribution of alkali probably represents the limits of tolerance for native prairie grass under irrigation. An amount approaching 0·5 per cent in the first 6 inches, underlaid by soil containing 1 per cent or more, of alkali would seem to be the extreme conditions under which the native grass might be expected to yield a crop. It is interesting to note, comparing the two series discussed, that the native prairie grasses are more alkaline resistant than Western Rye grass.

Group 1604.—No growth. Soil bare. The percentage of sodium sulphate throughout this group exceed 2.07, an impregnation too high to permit of any growth.

NOTE.—The samples in this group represent a depth only of 2′ .8, collection below the depth being made impossible by that caving in of the sides of the sampling bore.

OATS

Series III.—Sec. 17, Tp. 24, R W. of 4th Meridian.

These three soil groups were collected on July 17th, 1917, from a field in oats on Farm No. 8, Namaka Colony about 4½ miles Northeast of Strathmore, Alberta. The area had been under irrigation for some years but water had not been applied in 1917. The soil was a sandy loam of good quality. The yield of oats on the best parts of the field would be probably 75 bushels per acre; the portions showing distressed growth the yield would probably be scarcely worth the harvesting.

OATS

Series III. Sec. 17, Tp. 24, R. 24, W. of 4th Meridian.

Group	Depth	Growth	Na_2Co_3	Na_2SO_4	$Mg\ SO_4$	Total Soluble Saline Content
1620.....	0′·0—0′·5	Good	·061	.....	.....	·128
	0′·5—1′·5		·065	.....	.....	·112
	1′·5—3′·0		·065	.....	.....	·136
	3′·5—5′·0		·060	.....	.....	·132
1619.....	"	Poor	·212	·108	·087	·480
			·149	.....	·138	·276
			·128	.....	·096	·232
			·077	.....	·066	·164
1618.....	"	No	·340	·343	·087	·842
			·292	.....	·087	·448
			·210	.....	·090	·312
			·128	.....	·077	·252

Discussion of Results —The alkali of this group is sodium carbonate, the characteristic salt of "black alkali" and, which, as already stated, is the most injurious of all saline impregnations. The limits of tolerance for most farm crops are usually placed by American authorities between .05 and .10 per cent.

The soil of group 1620 carried a good crop of oats and contained uniformly to a depth of 5 feet .06 per cent of sodium carbonate, in addition to trifling amounts of other and less injurious saline matter. These results must not be interpreted as proving that this concentration of sodium carbonate is harmless, but they are of peculiar significance in showing that this impregnation does not appreciably distress the oat crop on a light sandy soil well supplied with humus.

In group 1619 the concentration of alkali is highest in the surface soil (A—.212 per cent), decreasing steadily in the lower samples (D—.077 per cent). The growth was very sparse and poor, and it was evident that the limit of tolerance had been passed.

The samples of group 1918, taken from a location in the same field and absolutely bare of vegetation, show a very heavy impregnation of sodium carbonate, the highest concentration, .340 per cent, being found in the surface soil A, and decreasing with depth of sampling to .128 per cent in D.

A feature worthy of note in connection with these two latter groups is that the alkali is strongest in the surface soil, decreasing steadily and more or less uniformly, to the depth of sampling, 5 feet.

WHEAT

Series IV.—Sec. 3, Tp. 5, R. 22, W. of 4th Meridian.

The samples of this series were collected in a wheat field three miles north of Magrath, Alberta. The area was not under irrigation. The yield for the field at the date of this visit, August 8th, 1917, was estimated at 15 bushels per acre; in 1916 the yield of wheat was stated at 55 bushels per acre. The surface soil was a brown loam of fairly good quality, the subsoil a rather heavy clay.

WHEAT

Series IV. Sec. 33, Tp. 5, R. 22, W. of 4th Meridian.

Group	Depth	Growth	Na_2SO_4	$MgSO_4$	$CaSO_4$	Total Soluble Saline Content
1634	0′·0—0′·5		.....	.....	.....	.....
	0′·5—1′·5	Good	·178	·087	·163	·440
	1′·5—3′·0		·877	·132	·447	1·572
	3′·0—5′·0		·973	·563	2·926	4·640
1633	"	Poor	·123	.....	.....	·180
			·701	·247	·491	1·480
			·719	·309	·588	1·680
			·799	·062	·192	1·060
1632	"	No	1·741	·900	·648	3·260
			1·001	·323	·364	1·700
			·701	·222	·220	1·164
			·579	·084	·192	·900

Discussion of Results.—This is a case of white alkali, the percentages of sodium sulphate being accompanied with notable amounts of magnesium sulphate.

In group 1634 good growth "A," representing the first 6 inches is free, or practically free, of alkali. "B" (0′.5-1′.5) contains a notable though not heavy impregnation, the percentage of sodium sulphate slightly exceeding,according to most authorities, the usual limit of tolerance for the vigorous growth of ordinary crops. In "C" and "D" the alkali content is very large.

Group 1633, representative of the area carrying a meagre and poor growth, is of particular interest in indicating probably the limit of tolerance for wheat. In the first 6 inches sodium sulphate is present in an amount that would no doubt cause some distress, but would not inhibit all growth. But in B., C., and D there is a very marked increase in this salt, accompanied by magnesium sulphate, the totals being such as to entirely prevent root extension. The crop is therefore limited as to its foraging ground to the immediate surface soil.

Group 1632 contains in A (0′.0-0′.5) 1.741 per cent sodium sulphate and. 900 per cent magnesium sulphate. This concentration of alkali is asbolutely inhibitive for wheat, and indeed renders the soil worthless for common crops. The salts gradually decrease in amount to the 5 foot depth but in every instance the impregnation greatly exceeds the limit of tolerance.

ONIONS

Series V.—Lot 27-476, Summerland, B.C.

This series was taken from an onion field about 4 miles southwest of Summerland, Okanagan Valley, B.C. The area has been under irrigation for a number of years. The surface soil is a dark brown sandy loam well supplied with vegetable matter, the subsoil a sand mixed with silty clay. Samples were collected August 25th, 1917.

ONIONS

Series V. Lot 27–476, Summerland, B.C.

Group	Depth	Growth	Na^2CO^3	Total Soluble Saline Content
1628	0′·0—0′·5	Good	·135	·180
	0′·5—1′·5		·120	·160
	1′·5—3′·0		·072	·108
	3′·0—5′·0		·053	·108
1627	"	Poor	·224	·330
			·120	·138
			·087	·096
			·094	·098
1626	"	No	·529	·640
			·424	·440
			·135	·172
			·085	·120

The impregnation of this series is sodium carbonate, black alkali, other salts being present in traces only.

In group, 1628, the best growth, the concentration of alkali in the first 6 inches amounts to ·135 per cent, which somewhat exceeds the usually accepted limit of tolerance for farm crops in general. It would seem, therefore, that onions might be classed with those crops which are more or less alkali resistant.

The concentration, as in the other groups of the series, diminishes with depth of sampling, evidently a characteristic of areas impregnated with black alkali.

Group 1627, representing the poor and distressed growth, probably marks the extreme limit of toxicity which this crop can bear. The amount in "A," ·224 per cent is certainly much higher than crops in general could endure. In its lower members the alkali content corresponds very closely to that of group 1628, showing that it is the concentration in the immediate surface soil that is the crucial factor in determining growth.

The percentages of sodium carbonate of group 1626, are not much higher than in 1627, yet they are sufficient to inhibit all growth. In this series we have an illustration of the fact that in the case of black alkali slight differences in the concentration are of very considerable significance. With white alkali the differences which mark the limit of toxicity ar eof much greater magnitude.

It is proposed to continue these studies for a number of seasons, obtaining further evidence as to the limits of tolerance for various farm crops, and at the same time ascertaining to what extent and in what manner the distribution of alkali is affected by irrigation with and without drainage. The work here recorded is to be regarded as merely the first step towards the establishment of standards for Canadian conditions.

THE DIVISION OF HORTICULTURE

DUSTING FRUIT TREES FOR INSECTS AND DISEASE

BY W. SAXBY BLAIR, SUPERINTENDENT, ANNAPOLIS AND CORNWALLIS VALLEYS EXPERIMENT STATIONS

WE have been conducting experiments with the fine sulphur powder combined with dry arsenate of lead, the former to control apple scab, the latter insects, and comparing it with the regular lime-sulphur-arsenate liquid spray, which is the one generally used for the control of this disease and insects.

The dust spray is applied with a power-blowing machine, which throws out a cloud of dust. This envelopes the whole tree, settling on the leaves as a fine dust coating, thus giving the necessary protection by preventing the germination of apple scab spores, and killing any insects which feed on the parts dusted. The powder is very fine and sticks readily to the leaf. There does not appear to be any necessity to apply the dust when the foliage is damp. It seems, however, that a heavy rain immediately following an application of dust will wash considerably more of it off than had it remained on the foliage one night, as the atmospheric night moisture tends to set the dust particles into the leaf, and the coating gives the necessary protection for as long a period as do the liquid sprays applied.

It will be readily seen, therefore, that if the dusting is properly done there seems no good reason why the dusting would not be as effective as spraying. Experiments conducted at this Station would show this to be the case. There may, however, be some conditions not encountered during the two years these experiments have been conducted, which would change our views on this matter.

The matter of dusting versus spraying, therefore, as a practical orchard operation, resolves itself into a question of application; the cost of equipment necessary to do a thorough job, the cost of materials, cost of application, and the skill of the operator in doing the work.

RETAIN POWER-SPRAYING OUTFITS

We think it would be unwise for orchardists generally to do away with their power-spraying outfits and invest in dusting machines, although this may be advisable in some cases. The cost of materials will be much more per acre, as there is more waste in doing a good job with dust than with the sprays. The extra cost of materials will be offset by the lessened cost of application of the dust, which can be applied very much more rapidly, in fact as fast as a team can walk between the trees. The skill of the operator is a big factor, and good judgment, and rapid handling of the blowing tube, are necessary if a good distribution of the dust is to be made. There is not the wet foliage to guide one, as is the case when spraying, as the orchard is enveloped in a cloud of dust, and portions of the air may contain many times the number of dust particles that other portions do.

Difficulty is always experienced in getting a thorough job done at the top of tall trees with the liquid sprays. It has been noticed that such trees dusted have in general a better control of scab at the top than do the sprayed trees. This, however, is a matter for the operator to correct, because tall trees can be sprayed so that scab is controlled as well at the top as at the bottom of the tree.

It has been said that foliage injury, which is quite common on all sprayed trees, will not occur on dusted trees. This is not the case, as foliage injury may result from a dust application. It is not so likely to happen, however, and, generally speaking, there is less foliage injury where the trees are

dusted. The injury results from the arsenic in the dust, and the amount is evidently determined by the percentage of arsenic in the dust, and the period during which the foliage may be moist following the application.

Time is a big factor during the rush of orchard and farm spring work, and even were the results such that perfect control of apple scab is not possible as with the spray, it may yet be more profitable to dust, owing to being able to give time to other necessary work. It is pretty nearly a personal question with the grower as to whether he can dust more profitably than spray. Certainly, though, dusting so far has in our tests, covering two years, given a satisfactory scab control.

TESTS IN 1918

Tests conducted at this Station, in a mature orchard of Gravenstein apple, during the season 1918, gave results as tabulated below:

	Per cent scab				Per cent insect injury
	Bad	Medium	Slight	Total	
Lime Sulphur	.07	.0	.96	1.03	.5
Dust	.1	.4	6.6	7.01	.8
Check	3.4	6.2	53.1	62.7	2.0

No foliage injury was apparent on any of the trees.

The amount of material used, time required to apply it, and cost of material and labour was as follows:—

Material	*Dust*	*Spray*
Amount used per tree one application	2.86 lb.	6.82 gals.
" four applications	11.44 "	27.28 "
" acre of 40 trees one application	114.4 "	272.8 "
" " 40 trees four applications	457.6 "	1091.2 "
Time		
Time required per tree one application	.81 min.	5 min.
" four applications	3.24 "	20 "
" acres of 40 trees one application	32.40 "	3 hrs. 20 "
" " 40 trees four applications	2 hrs. 9.6 "	13 " 20 "
Cost of Material		
Cost of material per tree one application	$ 0.3003	$ 0.0716
" " four applications	1.20	0.2864
" acre of 40 trees one application	12.01	2.86
" " of 40 trees four applications	48.04	11.44
Cost of Application		
Cost of application per acre of 40 trees one application	$ 0.486	$ 3 00
" 40 trees four applications	1.94	12 00

It will be seen that the four applications per acre of 40 trees cost as follows:—

	Dust	Spray
Cost of material	$48 04	$11 44
Cost of application	1 94	12 00
	$49 98	$23 44

From the above it will be seen that the cost per acre was $26.55 more where the trees were dusted than where sprayed.

The lime sulphur used was made by diluting 2½ gallons of the commercial concentrated lime sulphur to make 100 gallons, and to this was added 2½ pounds of arsenate of lime to 100 gallons, costing $1.05 per 100 gallons, or 1.05 cents per gallon. The lime sulphur concentrate cost 20 cents per gallon and the arsenate of lime 22 cents per pound. The dust was that made by the Niagara Spray Company contained 90 per cent fine sulphur and 10 per cent poison, costing $10.50 per hundred pounds or 10½c. per pound. The time of team and one man were charged at the rate of 60 cents per hour, and one man at 30 cents per hour, or a cost of 90 cents per hour for team and labour. The trees were sprayed and dusted on May 20th, June 5th, June 20th, and July 6th.

THE HEALTH OF ANIMALS BRANCH

LIVE STOCK IMPORTATION RESUMED.

THE prohibition placed on the importation of cattle and other ruminants into Canada from the United Kingdom as the result of an outbreak of Foot-and-Mouth disease, announced in the November number of The Agricultural Gazette, has been removed. No further outbreaks of the disease having been reported in the United Kingdom since the 9th of October, importations of cattle, sheep, and other ruminants and swine, may be resumed on and after the first of January, 1919.

PROSECUTION FOR VIOLATING QUARANTINE ORDER

A rancher in Alberta has been prosecuted and fined the sum of $100 and costs for removing cattle from quarantined premises in the Big Valley district. The cattle owned by this man were quarantined for mange, with directions to be treated under the supervision of an officer of the Health of Animals Branch. The rancher in question failed to treat his animals, and also permitted them to run at large and come in contact with other cattle.

THE ENTOMOLOGICAL BRANCH

THE HISTORY OF THE CODLING MOTH IN BRITISH COLUMBIA

BY R. C. TREHERNE, DOMINION ENTOMOLOGICAL LABORATORY, VERNON, B.C.

IN presenting the history of the Codling Moth in the Province of British Columbia, I do so with a feeling of obligation to Thomas Cunningham, former Provincial Inspector of Fruit Pests, and his assistant, W. H. Lyne; to R. M. Winslow, former Provincial Horticulturist and his successor M. S. Middleton and to their field staffs of district horticulturists, who have allowed me access to unpublished records and who have given me verbal information respecting the various outbreaks in the years gone by.

The Dominion Entomological Branch has only been actively associated with the Codling Moth situation in the Province of British Columbia since 1916. During 1916, 1917 and 1918, life-history investigations have been conducted by the Dominion officer and advice has been given to the Provincial horticultural field officers, during these years, in order to enable the eradication and control measures that were instituted to be carried on to the best advantage. I take credit only in having conducted the life-history investigations and in compiling the record submitted herewith. The field work against this destructive insect, at all times, has been strictly in the hands of the Provincial officers to whom all credit is due for the position British Columbia is in to-day in regard to relative freedom from Codling Moth infestation.

The history of the Codling Moth in British Columbia may be viewed from two separate standpoints: To students of entomology the record will disclose interesting results of eradication methods against incipient and prolonged outbreaks; to the fruitgrowers of the province the record will show what work has been accomplished on their behalf and the danger that lies ahead from present infestations.

By way of introduction it will only be necessary to review the status of the fruitgrowing industry of British Columbia. In 1890, the census showed 6,000 acres of fruit; in 1900, 8,000 acres; in 1910 the census showed 33,606 acres; in 1913, 38,196 acres; to-day there are approx mately 40,000 acres of fruit which are largely composed of apples. The apple crop of 1917 was 2,959 carloads with approximately the same for 1918.

THE VARIOUS OUTBREAKS

1. *The Victoria Outbreak*—The Codling Moth was first recorded in British Columbia in the vicinity of Victoria. The actual year in which larvæ were first discovered is in doubt, but it occurred at some time between 1900 and 1905. The close resemblance of the larva of the Codling Moth to the larva of the Lesser Apple Worm (*Laspeyresia prunivora*) and the similarity of attack, clouded the issue at this time, coupled with a certain hesitancy on the part of Government officials to acknowledge its presence. The introduction of the moth on this occasion was believed to have been caused by the introduction of infested pears from California. This belief is supported by the fact that the first determined larvæ were found in orchards adjoining a picnic ground and by the fact that infested Californian pears were being received at that time on the market of Victoria. In 1906 and 1907 no remedial measures were undertaken but in the latter year the moth had increased to such an extent that remedial measures had to be undertaken. In 1908, 164 orchards were found to be infested and 3,140 sacks of infested fruit were

destroyed. Compensation was allowed certain growers in the locality inasmuch as some fruit was destroyed which apparently was not infested. In certain orchards the infestation was as high as 40 per cent. It may be remarked that the seasons of 1907 and 1908 were usually warm both in spring and summer.

In 1909, following a careful inspection of the trees in the infested area, 7,610 larvæ were captured. In 1910, the first gasoline power spraying machines used in the province, were operated in the Victoria Codling Moth area, a total of 12,931 trees being treated this year. In addition, 4,162 trees were sprayed by hand machines.

In 1911, inspection work during the year, revealed the presence of 7,000 larvæ, 77 orchards being involved. In 1912, 1,350 larvæ were taken in 50 orchards. In 1913, 432 larvæ were taken, and in 1914, 239 larvæ from 9 different properties. In 1914, an increase in the area of infestation took place, resulting in 291 larvæ being taken in 21 orchards in 1915. In 1916, 1917 and 1918 no work under Government control took place.

It is believed that the Codling Moth still exists in the Victoria district, but the possibility of it becoming a serious orchard pest is not considered very great unless the district is again visited by a series of abnormally warm seasons.

2. *The Kamloops Outbreak*—Larvæ were discovered in the summer of 1905 within the city limits of Kamloops, but there is little doubt that the infestation was present for some years previous. As in the case of the Victoria report the identity of the Codling Moth was confused with the Lesser Apple Worm. The introduction was believed to have been made through the medium of apples imported from Ontario. This outbreak proved an exceedingly difficult one to handle owing to its being located in city lots involving many separate owners, and on rented land. The summer of 1906 was, therefore, practically spent in demonstrating, pruning and spraying, and deter-

CAGE USED NEAR VERNON, B. C., FOR STUDYING LIFE-HISTORY OF THE CODLING MOTH (ORIGINAL)

mining the limits of the outbreak. In 1907, the same work continued, 2,296 trees being sprayed, In 1908. the infestation was reported as 1 per cent and confined strictly within the city limits. In 1909, spraying and inspection continued. In 1910, evidently owing to the difficulty of dealing with the outbreak which apparently had been reduced to very small limits, the entire crop of apples was picked green upon the trees in July and August and destroyed. Remuneration was allowed to cover individual losses in apples. In 1911 and 1912 no larvæ were found. In 1913, however, an examination in late summer revealed the presence of a few larvæ and some empty cocoons. In 1914, therefore, the campaign again continued with a single power outfit at work, and a later inspection resulted in 12 larvæ being found. In 1915, in order to deal with a very tantalizing situation pressure was brought to bear which resulted in many worthless trees being cut down and the remainder severely pruned. Two sprayings, with hand and fruit inspections followed in an effort to cause complete eradication. The Government efforts were evidently successful because no larvæ have been taken in 1916, 1917 or 1918.

3. *The Kaslo Outbreak*—The moth was bred from apples grown at Kaslo in 1905. According to the reports of Dr. J. Fletcher, former Dominion Entomologist, this record was the first of its kind for the province, but in the light of later information there is no doubt that the outbreaks at Victoria and Kamloops preceded it. In 1906, moths were again bred from local grown apples and remedial measures instituted. These measures were either so successful, or the moth found conditions unsuitable to its growth and development, that no further reports of infestation have been received.

4. *The Armstrong Outbreak*—Early in the summer of 1912, twenty larvæ were taken in apples at Armstrong. Immediate inspection was undertaken, resulting in 20 trees being found infested. The introduction occurred presumably through the medium of packing cases from some Oregon nursery. The entire crop on these 20 trees was bought in bulk, green upon the trees, placed in sacks and boiled.

This method should have been sufficient but in order to obviate any possibility of further outbreak the area was thoroughly sprayed in 1913 and an inspection of fruit followed. No larvæ were taken in 1913 or in any succeeding year.

5. *The Rutland Outbreak*—About 100 larvæ were taken in fruit at Rutland in 1912. Immediate inspection resulted in an area one mile square being found infested. Strict quarantine methods were instituted and all fruit handled under Government guidance. In 1913, two power spray outfits were placed at work, and inspection of band and fruit followed, resulting in no larvæ being taken this year or in any year succeeding. There was apparently no doubt but that this outbreak originated from infested fruit in settlers' effects from Ontario, the empty cocoons being found.

6. *The First Kelowna Outbreak*—On August 19, 1913, an infestation covering 5,000 trees was discovered within the city limits of Kelowna. The campaign in this year resulted in from 75-100 larvæ being taken. The moth was probably introduced through the medium of infested railway cars. In 1914, three thorough sprayings were given the infested area with four power machines in operation. At the close of the year, 12 larvæ had been captured. In 1915, under similar quarantine measures, 3 larvæ were taken. In 1916, following the same procedure as in the two previous years, only one suspicious example of infested fruit was reported, the cause of the injury not being discovered. In 1917 and 1918 no further sign of the moth was revealed.

7. *The Second Kelowna Outbreak*—A second outbreak, of a separate origin to the first, but probably from a similar source, occurred in Kelowna in 1915. The trees involved were sprayed, banded and inspected and only 14 larvæ were taken this year. No further report of the presence of larvæ was received in 1916, 1917, or 1918.

8. *The Okanagan Landing Outbreak*—In September, 1915, larvæ were noticed in some fruit in orchards at Okanagan Landing. Close inspection revealed the fact that five properties were involved, covering approximately 80 acres, and 5,000 larvæ were collected. No actual accurate larval counts were made, hence this figure is approximate. There was little doubt that the infestation had become established a few years previous, and had started from larvæ swept from railway cars at the Landing.

In 1916, quarantine measures were adopted. No actual larval record was kept in this year, but the belief of the inspectors was that fully 3,000 apples were condemned as "wormy." In 1917, the regular quarantine and eradication methods with eight band inspections were again adopted resulting in 550 worms being taken by the end of the year. In 1918, owing to the difficulties of properly handling the outbreak, the entire crop of 35 acres was bought and pulled off the trees during June, July and August. Band and fruit inspections followed resulting in 112 larvæ being taken. The last larva was found in the middle of August, no more being taken in two later tree-to-tree band inspections. Unfortunately, however, the flight of second generation moths in August caused a re-infestation in orchards in the vicinity which, either had never before been infested, or which had been declared free from infestation for two years. These orchards, now infested, are located at least half a mile from any orchard attacked in the spring. At the close of the 1918 season in the entire Okanagan Landing district 369 larvæ have been taken over an area of about 109 acres.

9. *The Westbank Outbreak*—In August, 1915, a severe infestation was discovered at Westbank involving 24 different properties. Autumn inspection of fruit resulted in approximately 5,000 apples, doubtless attacked by the larvæ, being destroyed. There is little question that a fair proportion of these apples were, in reality, attacked by the Lesser Apple Worm. As in the case of the Okanagan Landing outbreak of this year, the lateness of the season and the need for rapid work precluded any opportunity of making exact larval counts. In 1916, the usual spray applications followed by band and fruit inspections, yielded in the neighbourhood of 500 worms. In 1917, following the same procedure, about 50 larvæ were collected and in this year, 1918, until the close of the year, after similar operations to 1916 and 1917, only 6 larvæ and 2 empty cocoons were taken. The last larvæ were taken on September 6th, and nothing in two later band inspections. The remarkable feature of this outbreak lies in the fact that the few larvæ taken in 1917 and 1918 were captured in fairly widely separated areas, covering an area nearly equal to the original sphere of infestation. In this outbreak approximately 200 acres were involved. In 1906, 7,788 trees were banded, and 8,000 in 1917. These bands were inspected 5 times between July and October.

It may be remarked that some larvæ, approximately 100, were discovered at Gellatly's in 1916, fully one mile from the nearest infested orchards at Westbank. Whether this infestation was due to the flight of moths, or to careless handling of fruit boxes, it is impossible to say, the former method of dispersal being considered feasible under the conditions attending the outbreak.

10. *The Eburne Outbreak*—Two larvæ and twenty attacked but abandoned apples were found at Eburne in

1915. Examination of the area, in 1916, revealed no further sign of infestation, though no remedial measures were definitely undertaken in this year. The prevailing temperatures and high humidity of the locality doubtless reacted against the successful propagation of the moth.

11. Two or three larvæ were reported from Kaleden in 1916. It is possible that confusion has arisen in this case with the larvæ of the Lesser Apple Worm, for no further sign of the Codling Moth has since occurred.

12. *The Vernon Outbreak*—During the winter of 1917-1918 a rumour was received that Codling Moth larvæ had been received in the packing houses from Vernon orchards during the 1917 apple packing season. Careful inspection during March, 1918, revealed the presence of 4 larvæ in the bark of some old apple trees in the City of Vernon. In June, all the developing fruit on 41 old trees in the vicinity was removed, and on 9 small trees, left to act as traps, the fruit was picked during the first week of September. Altogether during the year, (1918) 17 forms of Codling Moth were taken in Vernon.

13. *The Walhachin Outbreak*—During the autumn of 1916, larvæ were found in orchards at Walhachin. An area covering 60 acres was found liable to be infested. Spraying, band and fruit inspection work was undertaken during 1917 and 1918. In 1917, about 100 larvæ were taken; in 1918 no sign of larvæ was indicated, following four band inspections and the examination of the fruit output.

THE PRESENT SITUATION

At the close of the year 1918, Codling Moth larvæ in limited but unknown quantities are believed to exist in the city of Vernon, and in the orchards in the vicinity of Okanagan Landing, covering an area of 109 acres and involving 200 additional acres in the vicinity. The Walhachin and Westbank outbreaks are apparently in a most healthy condition. To be optimistic it might be said that the orchards at the last two points may be considered free from infestation. For safety's sake, however, it is well to be guarded for the reason that precautionary measures are doubtless still needed. At Victoria, the moth is still believed to exist, but unless an unusal series of seasons approach, this outbreak is not viewed with great alarm. Kamloops, Kaslo, Armstrong, Rutland, Kelowna, Eburne and Kaleden are all supposed to be free from infestation, having been clear for from 2 to 12 years.

In order to express the history of the Codling Moth in another way, it may be said that since 1905, at least 12 and probably 13 distinct outbreaks have occurred in the province, at widely separated points. A marked increase in the numbers of outbreaks occurred after the year 1912, coincident with a noted rise in the fruit yielding capacity of British Columbia orchards. Altogether, since 1908 at least 40,000 Codling Moth larvæ have been collected and destroyed by hand labour, and at least 50,000 apple trees have, in this time, been under careful surveillance and inspection. In the year 1912, approximately 470 larvæ were taken in the province; in 1913, 542 larvæ; in 1914, 263 larvæ; in 1915, 10,330 larvæ; in 1916, 3,553 larvæ; in 1917, 625 larvæ, and in 1918, 394 larvæ.

In the year 1912, operations, tending towards the eradication of the Codling Moth were being carried on at 4 localities; in 1913, at 5 localities; in 1914 at 3 localities; in 1915 at 7 localities; in 1916 at 7 localities; in 1917 at 3 localities; in 1918 at 3 localities.

GENERAL ORCHARD OPERATIONS IN INFESTED AREAS

The following operations are undertaken wherever an outbreak is reported:

(1) All trees are banded.

(2) Periodical inspections are given the bands and main tree trunks:

(a) In May, for overwintering larvæ.

(b) In early July, for first generation of full grown larvæ.

(c) In late July.

(d) In mid-August (optional, according to seasonal development).

(e) In September for second generation larvæ.

(f) In October.

(3) Windfalls from July onwards are disposed of by boiling and burying.

(4) Two or three spray applications commencing with the calyx spray are given.

(5) All root sucker growth is removed from the trees.

(6) All loose bark and dead wood is removed.

In certain circumstances with closely confined infested areas, where labour difficulties arise, or spraying operations are not feasible, resource is had to the direct removal of the fruit by hand immediately after blossoming. This usually agrees with the period of year in a fruit grown district when labour is more available.

FRUIT DISPOSAL IN INFESTED AREA

The following procedure is adopted:

(1) An order for the formation of a Codling Moth quarantine area is passed under the authority of the Agricultural Associations Act.

(2) All tree fruit is inspected before shipment.

(3) Inspectors are notified when shipments are intended.

(4) All fruit is packed in a packing house in the infested area, no fruit being allowed to be handled in a house through which fruit from a non-infested area is passed.

(5) All orchard boxes used in quarantined areas must remain in such areas unless passed by an inspector.

(6) All fruit in infested areas is loaded into railway cars by the most direct route and no such fruit is allowed to be sold in the province or for export from Canada.

(7) Loose or unpacked fruit must not be moved from a quarantined area without permission from an inspector, and no fruit must be stored in cellars or houses without proper inspection.

(8) Cull fruits must be at once made into cider, apple sauce, or be destroyed.

(9) Railway companies are requested to dispose of the sweepings from fruit cars before loading by burning.

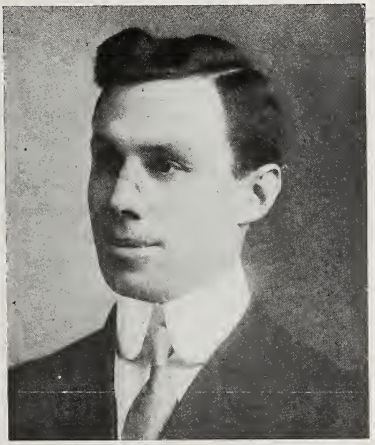
(10) Refrigerator cars are inspected at as few points as possible, and infested cars are kept closed, iced as soon as possible, loaded locally, or are rejected.

THE LIVE STOCK BRANCH

PROGRESSIVE ACTIVITIES

LIVE Stock and Live Stock products are, and will be, in great demand. Any doubts that have arisen may be dispelled by careful study of normal and, in addition, the requirements from America due to war losses.

The Canadian product must in the near future be firmly established in the British market; competition from other countries can be met



W. R. REEK, B.S.A., ASSISTANT LIVE STOCK COMMISSIONER

successfully by quality in the product only. The demand for quality will become more insistent as the supply comes nearer to meeting the requirements.

The rearing of suitable animals by every farmer according to opportunity is one problem, the proper and efficient marketing of the live stock products in an equally difficult and important matter.

Steps have already been taken to inform the public of the situation, to ensure a higher quality by the elimination of the scrub sire, and to secure proper representation in Great Britain, in order that Canadian Live Stock interests will be carefully guarded and energetically kept to the fore.

ASSISTANCE TO CATTLE BREEDING

Pure-bred bulls are loaned to organized societies in newly settled districts and backward sections in some of the older provinces where farmers are unable to purchase pure-bred sires for themselves. Up to date, 2,104 farmers have been supplied.

CARLOT AND FREE FREIGHT POLICIES

The reasonable travelling expenses have been paid for any farmer, or authorized agent, of a number of farmers in any section of Canada who purchased one or more carloads of breeding stock in any part of the country, or of feeding and stocker cattle at stockyards in Western Canada, provided such stock was not purchased for speculative purposes.

To further protect breeding females under the free freight policy, the Live Stock Branch assumes 75% and the railways 25% of the ordinary freight charges on shipments of useful heifers, young ewes, and young sows offered for sale on the open markets at central stockyards, to country points, provided the stock was not purchased for speculative purposes.

Up to November 30, 1918, 93,021 head have been shipped under these policies.

Feed was scarce in many western districts during the past season. Freights were assumed to encourage transfer.

RECORD OF PERFORMANCE

Sixteen men are constantly employed making regular tests for breeders of pure-bred animals. This activity is a means only whereby the high producing cow can be properly recognized and authentic records kept as a guide regarding their progeny.

POULTRY

The standardization of eggs, the co-operative collection and marketing intelligence re markets and the stock improvement activities, have been prosecuted so vigorously that a strong foundation has been laid upon which we can build for the future with every expectation of success.

Co-operative marketing developed in many parts reaching its highest state in Prince Edward Island, and, coupled with this movement, came a demand for intelligence re markets. An intelligence system was devised, and a report is compiled and mailed once every week. Improvement of flocks followed in the wake due to poor quality of eggs and poultry received from many circles, for which undersized and mongrel birds were accountable. Inspection and flock culling was instituted, and the avenue for development opened is very large, and one which, if properly followed, up, will quickly regenerate the poultry of Canada.

Standardization of eggs as now administered under the "Live Stock and Live Stock Products Act" affects the entire Canadian Poultry industry, either directly or indirectly. Inspection of interprovincial and export trade will indirectly affect the local markets. This movement has established the superiority of Canadian eggs over ungraded products of competitors in the British markets, and also in our own cities. Quality is the paramount issue.

HORSE BREEDING

Assistance is now offered to clubs organized for the purpose of improvement in the horses of any particular district; this movement was commenced in 1915, and now there are approximately 200 clubs with a very bright outlook for 1919. Actual results must be obtained before assistance is granted; co-operative enterprise is encouraged.

The loaning of stallions will be continued in outlying and needy districts where no pure-breds are standing for service.

SHEEP AND SWINE

The sheep industry has by war conditions been emphasized, and is now under serious consideration by many would-be sheepmen. The educational campaigns of this Division have been to the point, and no man who is only beginning need be without proper assistance. The grading of wool, placing or bonusing rams, community breeding, dipping and shearing, and the co-operative marketing of lambs have been undertaken. The placing of rams of some single breed is encouraging community breeding, and will undoubtedly lead to greater co-operative enterprise later. Community dipping and shearing are now definite enterprises supported by the Branch.

Over 4,000,000 pounds of Canadian wool was graded in 1918. This wool was sold on a quality basis and the producers were paid according to grade.

Sections where pure-bred rams are really required have been assisted through the formation of societies.

Pure-bred boars are placed with farmers under similar conditions.

FEEDS

The supply and distribution of concentrated foodstuffs was very seriously affected by war conditions; regularly the trade handled these commodities, but the uncertainty of supply and delivery caused considerable apprehension in the country; consequently, to meet the emergency a feed division was formed.

Since January 1, 1918, the following has been purchased and sold:

Purchases.	*Sales.*
Screenings.....7,918 tons—110 bush.	6,716 tons—260 lbs.
Corn.....341,020 bush.	235,016 bush.—341 lbs.
Oilcake (slab).....10,000 tons.	7,399 tons—630 lb.
Oilcake (meal).....2,613.55 tons.	2,413 tons—50 lb.
Bran.....1,978.5 tons.	1,978.5 tons.
Middlings.....450 tons.	450 tons.

MARKETS BRANCH

Greater knowledge on the part of the producer *re* marketing has become a necessity. Few farmers only are able to visit the large live stock markets. Men are placed upon the large markets to study conditions, to report upon the stock passing through, to keep in touch with drovers, commission men, packers, railway officials, and any others who touch the live stock interests. Under the Live Stock Products Act stock yards are governed by regulation, and it is the desire that every accommodation be given the people to market intelligently and satisfactorily.

The class of stock reaching any market is indicative of the development of the industry in any locality; thus the market becomes an unmistakable indicator and one which will readily register improvement.

Yearly the markets are becoming more valuable for the transfer of stockers and feeders from districts short of feed to sections with sufficient; the farmer can more easily secure car-lots in this way than by driving over the country. The Branch acts as a medium in such cases.

Weekly a markets report is published showing the receipts, grading, and prices at the principal centres; this material is made use of by the agricultural press and many others.

Particular attention is given to shipments coming from co-operative organizations.

EXHIBITS

Educational advertising by various means is a necessity, and it may be done through the press, by bulletins, by moving pictures, or by exhibits at exhibitions which are permanent organizations. Through the latter millions of people may be reached and attracted; the impressions made by a carefully prepared exhibit denomstrating certain principles will not be quickly forgotten. The Branch has a very competent staff who are able to properly prepare exhibits with the idea of leaving definite impressions. This work is very important, and is carried on under the direct supervision of those immediately in charge of the work in the Branch, and must reach all the people possible through the medium of the fall exhibitions.

SPECIAL CAMPAIGNS

Conferences to which the Provincial Departments of Agriculture and the Live Stock Interests sent representatives were called to devise ways and means to meet the demands from Europe during the war. Poultry and hog-raising were particularly featured. The Branch prepared to assist, and did assist, wherever possible in the manner decided as a result of the conferences.

The war has been won. New problems are now upon us. The securing and holding of high class markets for our products must be undertaken immediately; this is a national question, but one which can be solved successfully by the hearty co-operation, in so far as possible, of every individual interested in the welfare of the country at large and in live stock particularly.

THE SEED BRANCH

SEED OATS FOR THE PRAIRIE PROVINCES

TO ensure an adequate supply of seed oats for the Prairie Provinces for the spring of 1919, on the recommendation of the Minister of Agriculture, the following Order in Council was passed under date of Nov. 28, 1918:—

Whereas the Order in Council dated the 2nd day of November, 1918 (P.C. No. 2674), has become inoperative by reason of the fact that the Board of Grain Supervisors has rescinded its Order No. 84 of date the 10th October, 1918;

And whereas it is essential to ensure an adequate supply of seed oats for the Prairie Provinces for the spring of 1919:

Therefore, His Excellency the Governor General in Council, on the recommendation of the Minister of Agriculture, is pleased to authorize and doth hereby authorize the Dominion Government Seed Purchasing Commission to requisition oats on the following conditions:—

1. The said Commission will accept oats suitable for seed at the Canadian Government terminal elevators at Moosejaw, Saskatoon, and Calgary, and shipped from any point west of Winnipeg.

2. The said Commission will pay for oats for milling and for seed and accept it as such at the above-named points at the following prices, basis Fort William freights and Winnipeg Grain Exchange prices for the day:—

For Manitoba oats:—
Commercial grades, no premium;
No. 2 seed, 3 cents per bushel premium;
No. 1 seed, 7 cents per bushel premium.

For Saskatchewan oats:—
Commercial grades, 3 cents per bushel premium;
No. 2 seed, 6 cents per bushel premium;
No. 1 seed, 10 cents per bushel premium.

For Alberta oats:—
Commercial grades, 8 cents per bushel premium;
No. 2 seed, 11 cents per bushel premium;
No. 1 seed, 15 cents per bushel premium;

provided always that the said Commission shall not be under obligation to accept delivery of any oats which are inferior to No. 2 seed and contain more than 100 wild oats to the pound.

3. The said Commission is authorized to send seed inspectors into any elevator, warehouse, or mill in the provinces of Manitoba, Saskatchewan, and Alberta, for the purpose of examining oats held in or at such elevator, warehouse, or mill that may be suitable for seed or milling; if the inspectors find in or at any such elevator, warehouse, or mill or in cars on track or in cars loaded over loading platforms any oats suitable for seed or milling such oats become thereby the property of the Dominion Government Seed Purchasing Commission, and such oats are subject to immediate shipment to the order of the Dominion Government Seed Purchasing Commission when cars are obtained. For such oats the said Commission will pay in accordance with the values named in clause two hereof, including the premiums named for the respective qualities of oats in each of the three provinces of Manitoba, Saskatchewan, and Alberta, the price to be determined on date of inspection.

It is well known that fruit crops deplete the land much more than annual crops of grain. Professor I. P. Roberts estimates that five bushels of apples remove about eleven pounds of nitrogen, one pound of phosphoric acid, and sixteen pounds of potash, and that the leaves of a tree large enough to produce the apples would contain ten pounds of nitrogen, three pounds of phosphoric acid, and ten pounds of potash, making a total depletion of the soil by the tree in fruit and leaves in one year, twenty-one pounds of nitrogen, three pounds of phosphoric acid, tnd twenty-six pounds of potash.

PART II

Provincial Departments of Agriculture

THE REST ROOM

In the march of progress for better agriculture, rural women are securing more of the comforts and conveniences that should be theirs. Men have never lacked meeting places on their visits to town, but women have had to do their shopping, and transact any other business they might have, and return home, almost without pause. The rest room has supplied the long-experienced deficiency. Here it is possible for women, often burdened with the attention of accompanying children, to find ease and attention. It will be seen by the following articles, contributed from different sections of Canada, that the movement to provide this accommodation has made rapid progress in the last five or six years, and is continually growing:

NEW BRUNSWICK

BY MISS HAZEL McCAIN, SUPERVISOR OF WOMEN'S INSTITUTES

REST rooms have not been established in connection with the Women's Institutes in this province. I shall endeavour to describe the sort of rest room that would serve the purpose for women who come into town to do business.

The rest room should be in the same building as the officers of the local Institute or in one close at hand. This arrangement would permit some one of the staff to have a general supervision of the room. The equipment should be simple, substantial, and chosen with good taste, keeping in mind the purpose for which it is intended. A sufficient number of comfortable chairs with a couple of large library tables and book cases should be provided. Magazines and books, with a few good pictures, would assist in making the room a real rest room. If possible the floors should be hard wood, with a few good rugs, or, if of soft wood, they should be covered with linoleum or rubber matting.

The rest room may be a gift outright by the women's institute for the benefit of its members, or it might be better for the organization as such to furnish part of the support, leaving the guests an opportunity of supplying their share. If this latter plan were adopted, the organization might pay the first cost of the room and its equipment, while the guests would pay the necessary subscription fee for its upkeep, which would include light, heat, literature, and janitor service. If such a room were sufficiently patronized a cafeteria established in connection with it would probably prove advantageous.

ONTARIO

BY MRS JAMES LAURIE, SEC. THEDFORD WOMEN'S INSTITUTE.

THEDFORD Rest Room was opened March, 1913, by the Women's Institute. This room, which is 20′ x 30′, has a lavatory 12′ x 8′ in connection, also a woodshed and storeroom.

It is furnished with couches, rocking chairs, organ, table, etc., and always supplied with good literature, writing material, and such like.

It is opened to the public every

Saturday, when some of the members of the Women's Institute are there to welcome the people and spend a pleasant afternoon and evening.

It is such a success, and everybody enjoyed it so well, that they added a kitchen 12′ x 12′, well equipped, which is very convenient, as the room is used for social evenings, teas, and meetings. The girls are always willing to supply music and make the afternoon pleasant for those using the room.

When the war broke out, there were more tables and sewing machines put in, and the room opened every Thursday "Working for the soldiers".

To raise money 10c. teas were held every Saturday in the rest room, three ladies from the country and three from the town providing the refreshments. Since the shortage of food penny bags have been placed in the homes and are collected once a month by the little girls and taken to the rest room and given to the Red Cross secretary.

The remark is often made, "I don't know what we would do without our rest room". It costs in the neighbourhood of $80 a year to keep it up. Once a year, the members are asked if they would like to give it up, but none would care to part with it.

MANITOBA

NOWHERE is the value of the rest room better recognized than in the Prairie Provinces. In scattered communities women have to travel in frequent instances a long way to do their shopping. They, therefore, badly need some centre at which they can pause and take the brief rest needed for recuperation. In bygone days the meeting place was usually the little local circulating library. While this place afforded scope for friendly chat, it gave little facilities for real rest, and, in fact, was rarely used for that purpose.

THE BEGINNING

In Manitoba the rest room as an institution has made considerable progress in recent years. As a matter of fact nine years ago such an institution was unknown. In 1910, far-seeing, philanthropical ladies of Virden recognized this great want. The matter was brought before the Home Economics Society of that town and a large room was rented for $15 a month that was divided into two. Gifts came in from various members of the society and in very short order the place was equipped with furniture, pictures, sofas, magazines, and daily papers. The Home Economics Society appointed a committee that took control of the details. Some grants from the town council and rural councils helped towards the financing, and, with the sale of refreshments, put the institution on a satisfactory financial footing. It is worth while quoting a paragraph from an account given by a lady prominent in the establishment of this rest room, showing not only the objects, but also the measure of accomplishment that has been achieved:

> To-day this room is the community centre for the women of the district. Many bring their butter and eggs here, having previously arranged with the town women for sales. In the early days of our patriotic work we gave out thousands of articles, cut ready to make, and hundreds of pounds of yarn for socks from this room, and thus got the whole countryside interested in this work and in this room. Our women feel at home here, leave their wraps and their children, get a cup of tea if they wish, meet other women. There is always some one in the rest room. In winter the women heat foot warmers, wrap up the children, etc., and go home in comfort. Doctors say if there was a rest room in every town there would be fewer sick women.

GROWTH OF THE MOVEMENT

From this rest room in Virden upwards of two hundred similar

establishments have been created in different parts of the province, very largely, it should be remarked through the action of Home Economics Societies. In many cases the township councils have been induced to lend their influence, recognizing that the more attractive the locality is made, and the better facilities for visiting and shopping, the greater will be the upward progress of business. In Portage la Prairie for instance, the council requested the ladies to appoint a representative from each ward to meet with that body. These ladies were organized into a Board of Management, and now the council pays the bills, while the ladies manage the rest room and submit a report of their methods and proceedings. The council of Portage la Prairie is elected on a two-year plan and, as each new councillor is elected, he selects a lady from his ward to act on the Board and the lady thus selected retires with the councillor, being of course reappointed with his re-election. A matron who is regularly engaged serves a 10c., 15c. or 20c. lunch, and any profit derived therefrom is expended on the necessary equipment and in the purchasing of facilities for writing and reading. The council provides, furnishes, and keeps the room in repair, pays for light, heat, telephone, and coal oil for cooking purposes, and the matron's salary. There is a sitting room, sewing room, kitchen, and the matron has a bedroom for herself.

CAREFUL BUT PROGRESSIVE.

In other places than Portage la Prairie, the councils have not been so liberal-minded, but determined women have overcome the difficulties presented. At Youngstown, for example by holding a dance and with contributions made by farm women a small sum of money was raised, and in 1916 a lot was bought for $165, half down. A building was planned that would cost $350, but opposition arose to going into debt. At this juncture the owner of a store offered accommodation free. This was at the time of the fall fair, and with considerable effort donations were secured of the necessary furniture and other equipment. After this a tag day was held, and ultimately, with picnics, box socials, and social evenings, $300 was secured for the building. A live committee was appointed, and with the help of a generous hardware man a rest room came into being, 20′ x 24′, with a kitchen 10′ x 10′, and a bed room for the matron of the same size, the whole having cost $1,250. Of this all but $450 has been paid off, and it is expected the entire debt will be cancelled in the near future. The Red Cross and W.C.T.U. are given the use of the building for their monthly meetings free of charge.

What has been done at Portage la Prairie and Youngstown has been accomplished in various ways in other places. The women's section of the Grain Growers' Association has exercised considerable influence in establishing these rooms and in providing for their equipment and up-keep.

BRANDON'S MODEL ROOM

One of the most efficient rest rooms is that of Brandon, which has the advantage of a large surrounding tributary territory. The Brandon rest room was opened on April 13 and in July had 3,800 visitors. During the first five weeks that the room was opened the number of visitors reached 1,200. This rest room originated with the Women Grain Growers, who corresponded with the various women's clubs in the district and induced them to appoint representatives, who were organized into the Brandon Rest Room Board. Each municipal council was asked to name one of its members to represent it on the Rest Room Board. The Board thus formed adopted a resolution pointing out the necessity for a rest room that was submitted to the city council and to various rural municipalities. The result was that the five munici-

palities bordering on Brandon gave grants of money aggregating $625; merchants of the city subscribed $600; the country women subscribed over $300, and the city council donated $100. A refreshment booth at the Grain Growers' picnic, held on the Experimental Farm, cleared $160, which was added to the fund. With the money thus obtained, a structure known as the old telephone building was rented and fitted up with the requisities to make the place comfortable and restful. A capable matron was engaged, and it is felt that the rest room at Brandon is filling a long felt want. While the expense of the room is rather over the $75 originally figured on, it is felt that the necessary revenue to meet expenses will be forthcoming from the activities set in motion by the Board.

THE BRANDON, MAN., REST ROOM.

The foregoing is a fair representation of what is being done in Manitoba towards the establishment of havens of rest for tired women and their infants.

ALBERTA

BY MISS BESSIE MCDERMAND, ASST. SUPERINTENDENT WOMENS' INSTITUTE

A FRIENDLY and comforting work has been accomplished by many Alberta Women's Institutes in establishing rest rooms. When the rest rooms were first started, the only object was to provide a clean and convenient place for the country shopper to rest, and leave her small children. This conservative view point has changed absolutely. Now in many villages the rest room is really an ideal community home, where the women gather in the hope of meeting other friends and enjoying a social chat over their cup of tea. Not alone

do the women monopolize the comforts of the community home, but the men also have a taste of the enjoyment it affords. Last week a report was received at the Superintendent's office that the Gem Women's Institute were going to give an "approved smoker" to their husbands at the rest room.

The rest room which was built at Taber a number of years ago has been the means of bringing the country and town women in touch with each other and has made them real friends; they have learned to co-operate successfully. The rest room is a thriving Saturday market every week, where the residents of the town secure fresh eggs, sweet country butter, and cream. In accomplishing true co-operation between country and town women this rest room is worthy of support.

The first rest room built in Alberta was constructed at Carmangay in 1913. It is used principally as a recreation centre by both the town and country people. Down-stairs there is one large room and a kitchenette, where many an appetizing lunch is prepared by hungry country folk after they have endured a long tiresome drive. This year when the Chatauqua was at Carmangay the Institute hired a woman at the rest room to care for the small children.

The Olds rest room has been made attractive to the high school girls, who drive in from the country and those who board in town. The rest room is well supplied with magazines and reading material and provides the comforts of a well furnished living-room, bringing them at least a taste of home environment.

Cereal rest room has been, and is, a great asset to the little town, as it has incidentally been the means of bringing a nurse of the Victorian Order to that place. The rest room is a pretty little bungalow with four rooms. When the Institute applied for a nurse they decided to make it her residence. They also gave her another room to be used for patients whom she desired to have near at hand.

Youngstown Women's Institute has just completed a fine building to be used for a rest room. The building cost them $1,500.00 and they have expended $150.00 up to date on the furnishings; a number of things have also been donated to contribute to its comfort. To raise the money the Institute gave several

CARMANGAY (ALBERTA) REST ROOM

entertainments, canvassed for subscriptions, and obtained grants from the municipalities benefitted by it.

Round Hill Institute expects to build a rest room in the near future. The Institute is convassing each member of the community for the donation of a board, or the price of one to help defray the expenses of building.

CEREAL (ALBERTA) REST ROOM

At the present time there are twenty-seven Women's Institute rest rooms in Alberta, each one supplying the need of its locality. In nearly every case they are the headquarters of the Red Cross and Field Comforts work. The Institutes' rest rooms do not confine themselves to certain districts of the province, for one may see the "Women's Institute Rest Room" sign as far north as Peace River, and as far south as Magrath. They may be used for band practices, co-operative market centres, homes for the sick, community recreation headquarters, hives of Red Cross industry; but these things are only the by-products, they are essentially rest homes.

The following institutes have supported rest rooms:

Athabasca,	Carmangay,	Crossfield,
Claresholm,	Delbourne,	Golden Centre,
Huxley,	Hanna,	Killam,
Kinsella,	Magrath,	Munson,
Nightingale,	Provost,	Red Deer,
St. Albert,	Strathmore,	Youngstown,
Cereal,	Vulcan,	Olds,
Taber,	Sexsmith,	Innisfail,
Barons,	Entwistle,	Castor,
Rosebud,	Sibbald,	Stavely,
Peace River,	Carstairs,	Bow Island.

THE UNITED FARM WOMEN

BY MARY W. SPILLER, PROVINCIAL SECRETARY

WHAT is the value of a rest room in the nearest town or village to the farm women in the neighbouring communities? It would indeed be difficult to estimate, but I have not the slightest doubt that the members of the various local branches of the United Farm Women of Alberta, who have established rest rooms, would testify to the fact that they more than repay them for the time and money which was spent in their establishment. The country woman, especially the woman who has young children, knows what it is to get them nicely dressed, all looking spick and span, ready for a drive of anywhere from six to fifteen miles, sometimes more, to the nearest town to

do her shopping. The day is hot, the roads are dusty, and when they arrive at their destination the children are all mussed up, and the mother feels tired, blown about and untidy; how nice it is to know that they can go straight to their rest room, have a wash and tidy up generally, rest a little while, and perhaps make a cup of tea, before they start out to do their shopping and to meet their friends.

VALUE OF THE REST ROOM

Even if one is lucky enough to own an auto, the rest room is none the less valuable, as even in an auto one gets pretty well blown about on a windy day, and, after battling with the elements for even a comparatively short distance, one appreciates being able to get one's hat straight once more and the stray ends of one's hair tidied up, while a refreshing cup of tea seldom comes amiss. It is also nice to have a place where one can meet one's friends and have a chat, instead of having to stand in the street, or in some store, and undoubtedly women will come to town much oftener if they know that when they have finished their shopping, they can go to a nice bright cheery room of their own, where they can sit and talk with others, or read a magazine, while waiting for their men folks to get through their business, which often takes up a considerable length of time, especially when parts of farm machinery are brought in to be repaired, or something of that sort. This usually means a long dreary interval spent sitting in a buggy, or auto, if there is no rest room, which detracts very considerably from any pleasure which the outing has for them.

USES OF THE ROOMS

The U.F.W.A. rest rooms have a variety of uses. In most places they are social centres, where meetings and entertainments are held. It is very much easier to get a good attendance at a meeting when it is held in a bright comfortable room, where the members are at least sure of warmth in winter time. Dishes are kept on hand, and as a rule there is a small stove where a kettle can be boiled, so that a light lunch can be served with very little trouble, which is sure to be appreciated.

THE EQUIPMENT

The establishment of a rest room is not a very difficult problem. The members get together, decide on a room or hall, or possibly a vacant store in the nearest village, which can they rent for the purpose. This being done, the next thing to consider is the furnishing, which does not need to be at all elaborate. For an ideal rest room, I would suggest a couch, some chairs, including a rocker or two if possible, a table, some benches to be used when meetings are held, a few shelves to hold dishes and a small stove. The main thing is to make the room as attractive and comfortable as possible with the least possible expenditure. Wonders can be performed with empty boxes and some pretty inexpensive muslin. For instance, an empty apple or orange box can be transformed into a wash-stand, while another would make a dresser. A looking-glass, needless to say, is a most essential article, as are also a wash jug and basin. Paper towels cost very little, and are more sanitary than the ordinary kind. Bookshelves should also be put up, or two or three empty orange boxes might be put together draped with muslin and made to serve the purpose of holding a library. A nice linoleum or congoleum on the floor will of course add greatly to the attractiveness of the room, and muslin curtains on the windows should not be omitted. A few pictures will cost little; cheap prints or pictures taken from magazines and framed with passe partout can be used.

THE FINANCING

The furnishing of a rest room must of course necessarily depend on the funds, and very often has to be done by degrees, beginning in a small way and adding improvements as time goes on. Funds are raised in a variety of ways, the most popular being by means of dances, box socials, and other entertainments. In the majority of districts I think experience has shown that it is easier to raise money at dances and box socials than in any other way. Some of the women interested in establishing a rest room will doubtless be only too pleased to donate some of the smaller articles, such as the muslin curtains, pictures, muslin for drapery and things of that sort. If sufficient money can be raised to purchase an organ, it will of course prove an invaluable addition, and would I imagine amply repay the members of the society to which the room belonged, for the money spent on it, especially when entertainments are held. One of our older U.F.W.A. locals has recently purchased two baby carriages which are kept in their rest room for the use of members who have to bring young babies to town, and what a blessing it must surely be to a mother to be able to put baby in a carriage and wheel him round, instead of having to carry him in aching arms while she does her shopping.

THE CARE

Who shall look after the rest room is a matter which must of course be arranged according to local conditions. If possible, it is a good idea to arrange for some woman living in town to open it up for a few hours on two or three days each week; oftener if possible. She would also be responsible for keeping it clean and tidy, for which she would expect a small remuneration. If this cannot be arranged, each member should have a key, so that she could use it at any time she wished, and some arrangement could be made for someone to come in and tidy it up once or twice a week. The former suggestion is of course preferable, and if a woman cannot be found to undertake the work for such remuneration as the members feel they are able to afford, perhaps a school girl would be glad to do it in the afternoons, thus making a little pocket money for herself, Doubtless the women in the village would be glad to co-operate with the farm women in establishing a rest room, as it would be of mutual advantage, because there is no doubt that farm women would come to town more often if they had such a room to make use of, and consequently money would be spent locally that would otherwise go to the mail order houses.

BRITISH COLUMBIA

BY W. J. BONAVIA, SECRETARY, DEPARTMENT OF AGRICULTURE

THE women's institutes of British Columbia have in several places of the province opened and maintained "Rest Rooms" for the comfort of women coming into town to do shopping. These have been established, furnished, and supported by the institutes, and have been of great comfort to those using them; possibly, had not the great war taken all time, energy, and thought, this movement might have developed into something larger, at least in the principal centres. At present all that is attempted is to have the rooms comfortable and kept clean.

Nelson W. I., had a rest room for a few years, but, on account of the cost of rental and upkeep charges, it had to be given up.

Oyster W.I., at Ladysmith maintained a rest room for some years. A number of the institutes within a

few miles of Victoria were in correspondence with women's organizations in the city to start a joint rest room, but nothing definite has been done.

Chilliwack W.I. has maintained a rest room for 8 years in one of the best business blocks of town. For the first few years the cost of rental and upkeep came to $200.00, but now they only pay $7.00 monthly. At first the merchants of the town gave from 25c. to 50c. each per month, towards the rental, the ladies collecting this; then the city and municipal councils each made a grant of $25.00 per annum in place of this; but since the war this help has been discontinued.

Comfortable chairs for adults and children, a table to spread one's lunch, steam heat in winter, and sanitary conveniences are given.

A MODEL REST ROOM

In the larger centres the rest room should be centrally located, an attractive room in a women's building; not of necessity a large structure, but a place where the women's organizations of the district might have their meeting place or club rooms; one room to be a rest room, where every woman would be welcome, and the municipal council to pay for the rental and unkeep of this.

There would be a kitchenette with oil stove and dishes, where, for a small charge, anyone might make a cup of tea or procure hot water; a lending library at a small fee; a women's exchange where all kinds of women's work might be sold on commission—from garden and dairy produce to cooking and needlework; and proper and complete sanitary conveniences.

In the smaller centres, a comfortable room could be easily arranged, with a bulletin board, where those frequenting the room might list any articles they had for sale; a lending library could be opened once a week; and sanitary conveniences arranged.

These rooms would have to be started by some women's organization and under their oversight, but as they are public conveniences for women and children, and sorely needed, they should be financed by the municipality.

THE COWICHAN INSTITUTE

BY ROBIE WHIDDEN, SECRETARY

THE Cowichan women's institute rest room was established three years ago, it being felt that members from a distance would be glad of a place where they could rest, write letters, meet friends, etc., when in town. It has more than fulfilled our expectations. We have in connection with our institute an excellent library, where books are distributed to the members four days in the week. The room is open daily from nine to six o'clock. During the winter months a fire is kept on all that time, and the members have the use of the crockery and other necessaries to make a cup of cocoa or tea.

The monthly meetings are held in this room which is also used frequently for social evening gatherings.

The upkeep of the undertaking amounts to about twenty dollars a month which is paid from institute funds. The president, Mrs. Blackwood Wileman, and directors feel it was a move in the right direction and would strongly recommend those institutes that have not adopted the plan to do so.

NOVA SCOTIA

AGRICULTURAL ACTIVITIES

BY J. S. ARCHIBALD, B.S.A., ASSISTANT CHEMIST

OWING to the epidemic of influenza, the opening of the Nova Scotia Agricultural College at Truro had to be postponed from week to week. It was hoped that it would be possible to open on Nov. 26th, but as the epidemic was still flourishing, the date was set for Dec. 3rd. It is planned to continue the classes through the Christmas vacation and extend the date of closing in the spring one or two weeks beyond that advertised.

RETURNED SOLDIERS' COURSE

Educational work for returned men who plan going on to the land, has been commenced at the Agricultural College. One year ago, two or three men reported for such a course, and were taken into such of the regular classes as seemed best suited to their needs.

This year, however, a special course has been inaugurated, particular emphasis being placed on practical work. The men are being given actual instruction in the ordinary farming operations, such as harnessing, ploughing, harrowing, thrashing. At this date twelve students are enrolled in this course and it is expected that this number will be increased. The length of the course will be eight months. As the class increases in size, plans will be formulated for placing the men for their practical work on various provincial farms under the observation of members of the college staff.

WHEAT

The recent post-card census taken by the Census and Statistics Office at Ottawa, shows an acreage of wheat in Nova Scotia this year of 32,000 acres as compared with 14,000 acres in 1914. The crop has been large and fairly well harvested.

To help bring about this very material increase, and to take care of it, the Provincial Department of Agriculture introduced some time ago, a policy of assisting in the establishment of small roller process mills throughout the province. The policy is a graded one, more substantial assistance being given to such mills as are established in the outlying districts at considerable distances from the railway, than to those more favourably located. As a result of the material assistance thus afforded eleven new mills have been erected since the war began and at least ten others are in operation.

Although the total increase may seem small in comparison with that in Western Canada, yet it represents somewhere from 75,000 to 100,000 extra barrels of flour for consumption in the province, all of which, when we consider that Nova Scotia is not primarily a wheat-growing province, means so much substitute.

Whether this increase will be maintained or not when normal conditions are restored is uncertain, but it would be a great boon if the farmers of Nova Scotia would reap at least one benefit from the war and learn to grow more of their own feed and import less.

BEANS

The special effort made last spring by the Horticultural Division of the Agricultural College to encourage bean growing by supplying seed of early maturing sorts, was largely nullified by the exceedingly unfavourable season. Late spring and early autumn frosts combined, with continued wet weather, were most detrimental to the bean crop. Results show, however, that where the Early Six Weeks bean was sown, a good crop was secured from it, while the stan-

dard varieties, such as Yellow Eye, failed.

The unfortunate feature of the "Six Weeks" bean is the colour (a greenish brown) and a rather thick, tough skin. While many like it, the quality is conceded to be inferior to the Yellow Eye. There is an opportunity for investigation here along the lines of plant breeding, viz., an endeavour to improve the quality of the bean, and yet retain its early maturing characteristic.

THE FEED SITUATION

Nova Scotian farmers are faced this year with even a more serious problem as regards feed, than they were a year ago. In many districts the hay crop was very short, and the promise of a most bountiful grain harvest was shattered by the unprecedented wet weather of September and October. Roots are the only crop which came up to expectations. Mill feeds are scarce and prices prohibitive. As a consequence many farmers are disposing of as much stock as possible and beef is a dead letter, so easy to obtain that the drovers can scarcely be induced to buy.

In one line, however, the Department of Agriculture has given considerable aid by importing and distributing some 2,000 tons of linseed oil-cake meal purchased in New York.

Further substantial assistance has also been given by the Feed Division of the Live Stock Branch of the Federal Department of Agriculture.

NEW BRUNSWICK

DEPUTY MINISTER OF AGRICULTURE

MR. E. P. Bradt, Morrisburg, Ont., who has been Agricultural Representative of the Ontario Department of Agriculture for Dundas and West Stormont during the past six years, has accepted the position of Deputy Minister of Agriculture with the New Brunswick Government with headquarters at Fredericton.

Mr. Bradt grew up on his father's farm in Haldimand County, and graduated at the Ontario Agricultural College in 1912. As Agricultural representative he has been especially successful in school fair and organization work and is strong in live stock and teaching. In 1917 his judging team won the championship for Eastern Ontario at the Ottawa Winter Fair, and later, with the same class, won the premier honour for the province at Toronto. Mr. Bradt will assume his new duties about January 15th.

MR. E. P. BRADT, B.S.A., DEPUTY MINISTER OF AGRICULTURE

ONTARIO

THE GOVERNMENT TRACTOR SERVICE

BY C. E. HOLLIDAY, TRACTOR SUPERVISOR

FOR the past two years the Ontario Department of Agriculture, as a feature of its campaign of greater production, has adopted the policy of introducing and demonstrating the usefulness of tractors on the Ontario farm. The work that was accomplished in 1917 was reviewed by Mr. Bailey in THE AGRICULTURAL GAZETTE for May, 1918. The experiences of the first year led to some changes in the policy for 1918, when an aggressive line of action was carried out.

A COURSE IN MACHINE PLOUGHING

In order that knowledge of the operation of farm tractors might be obtained, on the prompting of the Department, the Ontario Agricultural College arranged a two weeks' course in farm ploughing, embracing the subject of tractors, automobiles, gas engines, and electric motors, at which 155 farmers' sons and mechanics attended. Eleven different types of farm tractors were demonstrated and the lectures on structure, design, gears, magnetos, carburetors and radiators were supplemented by actual operation of the tractors under the direction of manufacturer's experts, who also gave demonstration of lining shafts, babbitting bearings, and other matters of relative interest. That the knowledge may become more general Agricultural Representatives have had special machines of standard makes at their disposal that they might explain their operation to the farmers in their different counties. While it is not possible to give the exact figures, so far as can be ascertained 770 tractors were employed on Ontario farms during the month of June.

RENTED TRACTORS

To better demonstrate the use and usefulness of the farm tractor the Department secured a score of tractors which were rented out to farmers in various parts of the province. Application for these tractors were so numerous, that, ultimately, the province had purchased an aggregate of 127. All are equipped with three-furrow ploughs and 50 per cent have double disc harrows. Two, three, and four wheel types, and one, two, and four cylinder designs were purchased and distributed, so that similar machines might not be working in the same neighbourhood. The Agricultural Representatives are responsible for the routing and general superintendence of the machines in their counties. The machines were arranged in ten groups, over each of which was an expert mechanic, who gave instructions to new operators, looked after the mechanical repairs, and operated the machines where necessary.

THE CONDITIONS

Applicants for the machines were required to make application to the Representatives, stating the number of acres that they desired to have ploughed or disced. The farmer was required to supply fuel and water at the machine, to board the operator, and to pay $2.25 per acre for ploughing and $1.25 for double discing once over. An alternative charge was arranged for of 50c. per hour, plus 50c. per acre, in addition to fuel and board, the charge in no case to exceed $2.50 per acre. The methods were optional. When the machines were not ploughing, they were sometimes rented to the councils for road work. Seventy-eight of the tractors have also been engaged in silo-filling. Gradually the difficulties experienced in operating and taking care of the machines are being overcome.

GOVERNMENT TRACTORS TO BE SOLD

Realizing that the purpose of this service has been accomplished, owing to the conclusion of the war, it has been decided to dispose of the machines to farmers or others who desire to purchase them. Already a number of the tractors have been secured by farmers who learned of their usefulness at the expense of the Department. The remaining machines are being put into sheds at central points in the province, where they are being overhauled and put in good working order for further private sale, or to be disposed of by auction before the next seeding season arrives. It is understood that there are now about 1,000 privately owned tractors in this province and the interest in the subject has been developed, to a considerable extent at least, through the work of the Department.

A CALF CLUB ORGANIZED.

BY G. B. CURRAN, B.S.A., AGRICULTURAL REPRESENTATIVE.

WE are organizing a Calf Club in Lennox and Addington County district and from the interest already exhibited we have hopes of distributing one hundred and fifty calves to boys and girls in the spring. We have departed somewhat from the usual system of buying the calves and allowing the boys and girls to draw lots for them. Instead of this the members of the club are permitted to select their own stock at whatever price within reason they choose to pay. It is realized that the children will take more interest in the stock that meets their personal preference than what may be obtained as the choice of another. The local bank lends the full purchase price of the animals on the note of the member endorsed by his or her parent or guardian, for one year. At the end of that time, if the member finds it necessary, he can have his note renewed by paying the interest at six per cent. Only registered pure bred heifers will be bought, and it is expected that fully 85 per cent of the calves will be Holsteins, 10 per cent Shorthorns, and 5 per cent Herefords, Angus or Ayrshire. Only dairy calves will be given in the southern or dairy districts and beef calves in the northern or beef raising section.

LIVE STOCK JUDGING COURSES

BY J. W. NOBLE, B.S.A., AGRICULTURAL REPRESENTATIVE

THE South Essex Board of Agriculture and the Department of Agriculture (Essex) Live Stock Judging Courses, were conducted by Messrs. J. M. McCallum of Shakespeare and R. S. Stevenson of Ancaster during the week of Nov. 26-30.

At Goldsmith, on Tuesday, classes of beef cattle, sheep, and hogs brought out lively discussions, about forty farmers being present. The classes of stock judged were Lincoln sheep, Shorthorn cattle, Duroc hogs. On Wednesday, at Cottam, Clydesdale horses, Shorthorn cattle, and Lincoln sheep were the subject of discussion and demonstration to about thirty farmers. The meeting arranged for Malden on Nov. 29th was cancelled on account of an epidemic of influenza in the township, all meetings being banned by order of the Board of Health.

On Saturday the annual live stock judging competition for the county was

conducted at Kingsville. Contestants were conveyed to the farms, where the live stock judging took place, and the boys were required to give oral and written reasons for their placings in each class. Classes of Percheron stallions, Hereford cattle, Holstein cows, Oxford ewes, and Duroc Jersey brood sows gave the boys an excellent opportunity of demonstrating their ability as judges. Some good work was shown in the placing and giving the reasons for placing in each class. The cup was won by John H. Wilcox, Woodslee, which gives him final possession, he having won the trophy three times. The competition was open to young men under 25 years of age.

COUNTY PLOUGHING MATCHES

Agricultural Representatives in several counties of Ontario conducted ploughing competitions on the farms of the individuals instead of having the competitors brought together on the same farm as in the usual ploughing match.

In Welland County, Mr. E. K. Hampson has organized the Welland and Lincoln Home Ploughing Association. Each contestant was required to plough at least an acre. The work was done under the following regulations:

1. Each competitor must plough at least one acre which will contain at least one stroke and one finish.

2. The approved depth of ploughing is six inches.

3. Competitors in all classes are allowed the privilege of drawing scratches and finishing with single ploughs.

4. Written proof of age by parent or guardian must accompany each entry in boy's classes.

5. Satisfactory evidence that ploughing is the work of the competitor must be furnished on request.

The score card:

Strikes	15
Finishes	15
Uniformity of depth and width of furrow	15
Ins and outs	5
Crown of ridge of land	15
Straightness	15
Practicability	20
Total	100

The work, though of a similar nature, was not necessarily uniform in other counties. In Peterborough county Mr. F. C. McRae had 15 entries, 11 in the men's class and 4 in the boys. In Grenville county, Mr. W. M. Croskery had 12 entries in the sod class and 6 in the stubble. It is Mr. Croskery's intention next year to have a class for two furrow ploughs.

CANNING CENTRES

THE Institutes Branch of the Department of Agriculture has established community canning centres at seven points—Parkhill in Middlesex County, Barrie in Simcoe County, Niagara-on-the-Lake in Lincoln County, Mapleton in Elgin, Guelph in Wellington, Stratford in Perth, and Grimsby East in Lincoln. At these centres supplies of fruit, vegetables, and chicken are put up for use in the Canadian military hospitals overseas and in Canada. Opportunity is also afforded in the centres for the women of the community to bring their own produce, containers, and supplies, and put them up for private use. This work began a year ago, when a well equipped centre was established at Parkhill. At this point, and at Barrie, large quantities of chickens are being canned, the objective at each of these centres being ten thousand birds.

The Department of Agriculture provides sufficient modern equipment for carrying out the work in a thoroughly scientific manner. This consists, in the main, of a boiler for steam supply, large galvanized steam kettles, vats, pulping machines, closing machines, and apparatus for sealing tin cans. In the majority of cases a motor is provided for power supply.

Women's organizations outside the institutes have generously co-operated in supplying free labour. The Department of Agriculture furinshes a qualified demonstrator to each centre. Various agencies have co-operated in supplying the necessary materials. Sugar, containers, vinegar, and spices, have been furnished by the Canadian Red Cross Society The Red Cross canning kitchen at Hamilton, and the provincial Experimental Fruit Station at Vineland, have helped greatly in organizing the work, installing the equipment, and, in many cases, directing operations. Much of the fruit and vegetables utilized in these centres would have been wasted had not this work been organized. An objective to the value of $100,000 for overseas shipment is expected to be reached in the various centres this season.

MANITOBA

CO-OPERATIVE CREDIT OPERATIONS UNDER THE RURAL CREDITS ACT

BY E. A. WEIR, B.S.A., AGRICULTURAL DIRECTOR, RURAL SOCIETIES CREDITS

THE Manitoba Rural Credits Act was passed in March, 1917, and the first society at Selkirk, twenty miles north of Winnipeg, commenced operations late that season, about June 15. The Act provides for a system of short term loans for seasonal operations and to increase production. During the season of 1918 ten societies have been in operation and their total credits approved up to November 1, 1918, were as follows:—

Roblin	$47,406
Minitonas	31,475
Swan River	25,135
St. Andrew's	22,648
Arden	17,900
Lansdowne	16,495
Lawrence	12,420
Westbourne	10,785
Glenella	9,850
Tenby	8.220

OBJECTS OF THE LOANS

This money was loaned for a great variety of purposes, including the following: Breaking land, buying horses, milch cows, pure-bred bulls, stockers, pigs, seed grain, feed, twine, portable granaries, machinery, fencing, digging wells, making building improvements, paying threshing bills, paying floating liabilities, etc. A summary of amounts loaned for various purposes is as follows:—

Putting in and harvesting crop	$64,606
New breaking	53,190
Purchase of stock	36,618
Floating liabilities	19,860
Machinery	17,035
Improvements	9,445
Threshing	1,580
Total	$202,334

WHAT HAS BEEN ACCOMPLISHED

Through this method of loaning much production has been possible that otherwise could not have been accomplished. It is conservatively estimated that over 12,000 acres of new land has been broken that could not otherwise have been done, and several thousand acres summer-fallowed properly. The item for live stock represents the purchase of swine, stockers, and feeders that otherwise could not have been accomplished, and also some pure-bred sires to improve existing herds. Mixed farming on a sound basis has been placed much closer within the reach of these borrowers.

By means of the rural credit societies many farmers are put immediately into position to do what they could hardly attempt inside several years working on their own resources. One farmer in the St. Andrews Society last year broke up fifty acres with part of a loan of $1,000. He thereby doubled the acreage he would otherwise have had in wheat, and secured an average crop of over 33 bushels per acre, making a gross return of over $3,300, he could not otherwise have had, for though a most industrious, honest, and thrifty man he had been refused credit through the regular channels. A borrower in the Roblin Society (Shell River Municipality) last spring had previously secured a quarter section of land. He did not at first take kindly to the scheme, but when the matter was fully explained to him he decided to take out $300. With this a tractor was hired and 60 acres broken. Another $200 was taken out to have this disced and to purchase seed, etc. In the meantime, his own outfit had broken 40 acres, so that now he has a field of 100 acres of new breaking all in good shape for next year's crop. A loan of $400 had enabled another man to break and prepare 60 acres, which, he declared, would have taken him several years had he been thrown entirely on his own resources.

AN EXPEDITIOUS EXAMPLE

An interesting case was that of a man of ample resources. One day he got a chance to secure a bunch of cattle which required a considerable amount of ready cash to handle. He applied to the bank, but the amount was in excess of that which the manager could lend on his own responsibility. To have furnished details to the head office and secure its consent would have taken considerable time and the opportunity would have been lost. He applied to the society for the amount required. A phone message was sent to the president, who immediately called a meeting. The directors were gathered together and the application approved. The cheque was made out and deposited to his credit the next morning. In the meantime, he had caught a train for Winnipeg, where he was to secure his cattle. The next morning he wired for the money, closed the transaction, and came back, with a bunch of stockers. The opportunity would have been lost but for the timely assistance of the credit society, and the prompt action on the part of the directors in assisting their neighbour to seize a favourable opportunity when it offered.

THE METHOD PURSUED

The method of loaning is simple. The plan of organization was described in Vol. 5, No. 8, of THE AGRICULTURAL GAZETTE. Fifty farmers subscribed to one share of $100 each, which represents the maximum liability of each for the debts of any other member. Only 10 per cent of each subscription is paid up, however. The rural municipality in which the Society is located and the provincial Government each subscribe to one-half the total stock taken by the farmers. Ten per cent of these subscriptions are also paid, making a total subscribed capital of $10,000 with $1,000 paid. This sum is invested in a sound security, and the proceeds go to the credit of the society

to be used to pay expenses, pay a dividend up to six per cent, or establish a reserve fund as the directors see fit. The farmers, municipality, and Government each name three directors on a board which deals with all loans. One of the Government directors is an agricultural graduate, who is available to make inspections and see that loans are spent for the purpose intended. All loans must be approved by a majority of the full board of nine directors. This local directorate is not only a great safeguard but it ensures many men getting loans who could not otherwise hope to do so. This has been proven many times.

LESSONS IN FINANCING

The local board also can often give a man a good lesson in financing. His plans are laid before the board of directors, most of whom are, of course, successful business farmers in the same neighbourhood. If a man through inexperience has been tempted to engage on what might prove to be an unprofitable project, the loan which he endeavours to secure to carry it on is, of course, refused. But the directors in such cases have shown a desire to assist their neighbours and give them the benefit of their experience. A loan may be granted on condition that it is used in the way that the board advises. For instance, a man in one society wished to secure money to purchase a small tractor. In the judgment of the board, the land which he was to work was hardly suitable for getting the best services out of a tractor, and he was advised to buy horses. The money was advanced to do this, and he is now making splendid progress, fully convinced that the advice he received from the board was sound.

THE REQUIREMENTS

Character and farming ability are taken into full account by this board, each of whom has had ample practical experience himself. The board also have laid before them with each application for a loan, a detailed financial statement of the borrower. This includes the number of acres owned and the location; the number of acres broken; encumbrances, if any; a complete valuation of all assets, including farm lands, buildings, implements, live stock, supplies, cash, and outstanding accounts. A complete statement of liabilities, including mortgages on farm property, chattel mortgages, lien notes aga nst machinery or implements. Amounts due the bank or other parties is also given. Statements as to the amount of fire, hail, and life insurance are included, though these do not figure in the amount of assets and liabilities. This statement, made by the applicant, is carefully scrutinized by the board, and revised if necessary. The excess of assets over liabilities or surplus assets, as they are called, represent, therefore, the farmer's net financial worth.

CHARACTER OF THE SURETIES

It is interesting to notice the net financial worth of some borrowers. In Arden society twenty-nine borrowers were granted credits of $17,900. Their total surplus assets were over $358,000. In Roblin seventy credits totalled $47,407, and the surplus assets were $650,000; surely ample security aside from the other safeguards carefully provided by the Rural Credits Act and described in the article previously referred to. Yet these loans represent real and great assistance to these farmers from conditions that hampered production.

The money is loaned at seven per cent, one per cent of which goes to pay the expenses of the society and six to the bank. The money is secured through the regular branch banks where the societies are located. The notes come due before December 31 of the year in which they are granted. When they are for land breaking, or the purchase of live stock,

they are renewed until the following December 31st, or until returns are secured from the land or stock. Thus the loan is a direct incentive to production. Farmers are not called upon to sacrifice live stock at an inopportune time, or to haul out grain in the fall when they should be ploughing for next season, and every one knows with threshing and labour shortage the fall season in the West is very short. Interest is paid on the various parts of the total credit extended, only as the money is actually required. A farmer received the actual amount of the loan, not the face amount less a deduction for interest.

NOTES SATISFACTORILY MET

The St. Andrews Society started operations in June, 1917. The directors that season approved credits of over $16,000, but only 60 per cent was actually used. This year credits of almost $23,000 were approved and 95 per cent has been actually used. Every borrower last year was a borrower again this year with one exception. Every loan was paid last fall on or before due date, except a few for breaking and live stock, which were renewable. This year two months before the notes are due 15 per cent have been paid up.

Conservative opinion says that the Selkirk district has gone ahead 60 per cent in the last two years through the accomplishments made with the additional loans and the community spirit engendered by the society, for the benefit is not purely financial but also largely social. A sure foundation is also being laid for further co-operative action. Many farmers are placed on a cash basis and are encouraged to keep better farm accounts and generally adopt more businesslike methods.

THE SHORT COURSE SCHOOLS

BY GEORGE BATHO, EDITOR OF AGRICULTURAL PUBLICATIONS

THE first arrangement as to the holding of short course schools in Manitoba was broken by the influenza epidemic. The courses were to have begun in November and continued three at a time until all were completed.

The impossibility of carrying out this plan has necessitated a complete rearrangement of dates; and now four circuits are planned, beginning after the opening of the New Year.

Fortunately, the situation has been relieved by the change in the military outlook. Some members of the Extension staff who were overseas will be back again, and four circuits can be conducted, instead of three.

Equipment being sent out by the Extension Service for each short course occupies a big automobile car. For each course a staff of six instructors is provided. The lectures are given each day for the two-weeks period on gas engines, live stock, field crops, farm book-keeping, cement construction and home economics. In addition to these there will be three other series of short courses each of one week devoted mainly to dairying, poultry raising and bee-keeping and at each of which a staff of three lecturers will be employed. If circumstances allow the planned circuits to go on, between twenty-five and thirty instructors will be constantly employed.

SASKATCHEWAN

PUBLIC HIGHWAY CONSTRUCTION

BY H. S. CARPENTER, DEPUTY MINISTER OF HIGHWAYS

UNDER the Highways Act of 1917, the Department of Highways was established to take over the administration of expenditure in connection with the maintenance and improvement of highways in this province previously carried on by the Board of Highways Commissioners. This department is now a regularly constituted department of the public service under the administration of the Minister of Highways and his Deputy, and has the administration of all moneys voted by the Legislature for the construction and maintenance of roads, bridges, and ferries.

The moneys voted by the Legislature for these purposes for the fiscal year 1918-19 are as follows:

Chargeable to Revenue	
Roads and bridges including aid to rural municipalities	$ 310,000
Ferry accommodation	100,000
Chargeable to capital	
Construction of highways	270,000
Construction of permanent steel and concrete bridges	110,000

The above amounts will all be spent during the present year for the purposes for which they are voted, with the exception of the $270,000 voted for the construction of highways. Because of conditions brought about by the war it has been the policy of the Department this year, as in the previous three years, to limit expenditures on our highway work to the lowest possible amount consistent with the maintenance of such roads as have been built, and the construction of only such new works as seem necessary in order that our farmers may be in a position to market the grain that they have been urged to grow to the end that production might be maintained to the highest possible extent. For these reasons no expenditure has been made from the $270,000 voted from capital for the construction of highways.

It is hoped, however, that now the war is over, more moneys will be available for carrying out the important work in connection with the construction and maintenance of our highways, and, with this end in view, the Department has devoted a great deal of time towards making preparation for increased activity as soon as conditions will permit. Early in the present year the province was divided into eight divisions for the purpose of highway administration, and a divisional superintendent placed in charge of each division. It is the duty of these divisional superintendents to control the expenditure of departmental money in each of their divisions, and to examine and report to the Department as to conditions of the highways, and to make recommendations as to the requirements of each division. A good deal of time has also been given this year to the revision of our main road system, making such modifications and extensions to this as will tend to its improvement. It is hoped, when this work has been completed, that in the older parts of the province, at least where railroad construction may not be expected to be continued to the extent that has been the case in the past few years, and where most towns have become pretty well established, that this main road scheme can be permanently carried into effect.

ADMINISTRATION OF EXPENDITURES

Moneys authorized by the Department for the construction and improvement of roads are expended either by Government road crews controlled and financed directly by the Department, or by means of contracts entered into with rural municipalities, whereby a rural municipality agrees

to look after the expenditures authorized by the Department for the construction of a certain specified road, in accordance with the Department's specifications; the Government to reimburse the municipality when the work has been satisfactorily completed and a certificate to this effect been obtained from an official of the Department. The ferry service is free and is maintained and operated directly under the control of the Department. Small timber bridges are for the most part constructed by Government bridge crews directly under the control of the Department, working on a day labour basis. The larger bridges consisting of steel bridges on concrete abutments are let by contract.

For the purpose of encouraging rural municipalities to look after the maintenance of earth roads, a direct grant is made to each municipality of a large amount of the revenue derived from motor license fees. This money must be used only for the maintenance and repair of main roads leading to market towns.

RURAL MUNICIPALITIES

In rural municipalities the money for road and bridge construction is obtained generally from current taxes, though municipalities have in the past raised money for this purpose from the sale of debentures. No specific taxes are levied in rural municipalities for road improvement work, or other public work. The council sets aside from revenue of the municipality so much as it determines can be allocated for the improvement of such roads as the council selects. The Department of Highways exercises no authority, or control, over the expenditure made by a rural municipality, or over the selection of the roads upon which the council will spend its money. There are exceptions to this, however, in cases where an agreement is entered into between the Department of Highways and the rural council for a certain improvement to which both the Department and the council contribute, in which case, of course, the expenditure must be made on a location approved by the Department.

RESIGNATION OF HON. W. R. MOTHERWELL

THE resignation was announced on December 12th, 1918, of the Honourable W. R. Motherwell, Minister of Agriculture for Saskatchewan since 1905. Subsequently it was stated that the Honourable Geo. E. Langley, Minister of Municipal Affairs, was assuming the duties of Minister of Agriculture during the present session of the Legislature, and that afterwards there would be a rearrangement of portfolios.

STUDENT ENROLMENT, 1918-19

On account of the epidemic of influenza which swept over Canada, the opening of some of the agricultural colleges and schools was interfered with, the Saskatchewan College of Agriculture and the agricultural schools in Alberta remaining closed until the New Year. The following statements give the number of students enrolled at those institutions that have opened and the veterinary colleges in Canada for the college year 1918-19:

NOVA SCOTIA AGRICULTURAL COLLEGE

THE enrolment of students at the Nova Scotia Agricultural College includes a number of returned soldiers. Following are the enrolment figures:

First year	16
Second year	18
Returned Soldiers' Course	11
Total	45

MACDONALD COLLEGE

The enrolment of men and women for the different years for Macdonald College is as follows:

School of Agriculture—	
1st year	16
2nd year	15
3rd year	4
4th year	None
Total	35
School of Household Science—	
Institution Administration, Senior	15
Institution Administration, Junior	3
Homemakers	38
Autumn Short Course	10
Special students—Sewing	2
Total	68

SCHOOL OF AGRICULTURE, STE. ANNE DE LA POCATIERE

The School of Agriculture has accepted this year students as young as fourteen years for the various classes, the numbers enrolled being as follows:

Agricultural Course—	
First year	17
Second year	8
Third year	17
Short Course—	
First year	57
Second year	6
Total	105

OKA AGRICULTURAL INSTITUTE, LA TRAPPE

The fall course at the Oka Agricultural Institute opened with the following enrolment of students:

First year	30
Second year	9
Third year	12
Fourth year	12
Special courses	47
Total	110

ONTARIO AGRICULTURAL COLLEGE

In the agricultural course there are 4 women in the first year and one in the third year. Following is the enrolment for the different years:

Agricultural Course—	
First year	84
Second year	36
Third year	19
Fourth year	22
Special courses in Agriculture	2
Total agricultural students	163
Manual Training Course—1 year	3
Domestic Science Courses—	
Jr. Normals	14
Sr. "	8
Jr. Associates	27
Sr. "	9
Jr. Housekeepers	13
Sr. "	17
Homemaker Class	20
Short Course students	5
Total Domestic Science students	113
Total attendance	279

MANITOBA AGRICULTURAL COLLEGE

Registration at the Manitoba Agricultural College is not yetcomplete, a good many of the students not being able to come in for a week or two on account of sickness and other reasons:

Students in Agriculture—	
First year	74
Special class for boys of 14 and 15 years of age	14
Second year	32
Third year Diploma	5
Third year Degree	4
Fourth year	8
Fifth year	10
	147
Students in Home Economics—	
First year	34
Second year	22
Third year	12
Fourth year	5
Fifth year	5
Institutional Management	3
Total	81

SASKATCHEWAN COLLEGE OF AGRICULTURE

On January 2nd the students enrolled were:

Associates	44
Degree	21
Total	65

COLLEGE OF AGRICULTURE ALBERTA.

In addition to the regular course in agriculture, instruction is given in a special course for invalided soldiers. Most of the first and second year work in this province is given at the Schools of Agriculture. Following is the enrolment:

Third year	8
Fourth year	5
Final year	5
Returned soldiers	45
Total	63

BRITISH COLUMBIA COLLEGE OF AGRICULTURE

The British Columbia Agricultural College is not yet fully equipped. All students proceeding to the B.S.A. degree are required to hold matriculation certificates. This high standard results in a small enrolment. For the college year just opening the enrolments are:

First year	8
Second year	4
Total	12

ONTARIO VETERINARY COLLEGE

Seventy.five students have enrolled for the college year. These are divided in the different years as follows:

First year	19
Second year	18
Third year	38
Total	75

SCHOOL OF COMPARATIVE MEDICINE AND VETERINARY SCIENCE, MONTREAL

The class at the School of Comparative Medicine and Veterinary Science is smaller than usual but additional candidates are expected with the demobilization of the army:

First year	6
Second year	8
Third year	16
Total	30

RECAPITULATION

Institution	*Men*	*Women*
Nova Scotia Agricultural College	45	..
Macdonald College	35	68
Ste. Anne de la Pocatiere	105	..
Oka Agricultural Institute	110	..
Ontario Agricultural College	162	117
Manitoba Agricultural College	147	81
Saskatchewan College of Agriculture	65	..
Alberta College of Agriculure	63	
British Columbia Agricultural College	12	..
Ontario Veterinary College	75	..
School of Comparative Medicine and Veterinary Science	30	..
Totals	849	266

PART III

Junior Agriculture

DEMONSTRATIONS, COMPETITIONS, AND CLASS-ROOM STUDIES IN RURAL LIFE FOR BOYS AND GIRLS

DOMESTIC SCIENCE IN RURAL SCHOOL

NOVA SCOTIA

BY L. A. DEWOLFE, TRURO, DIRECTOR OF RURAL SCIENCE

PRACTICALLY every town in Nova Scotia has its Domestic Science Department. In rural districts, however, we are only beginning.

There is no incentive for the teacher to teach an extra subject. The people do not demand it. The school of a generation ago suits the people of to-day. A few energetic teachers, however, teach sewing about one hour a week. Possibly 100 teachers conduct sewing classes part of the term. Owing to the need of greater equipment, practically no one undertakes cooking.

There is no grant to defray expenses of sewing or cooking materials or equipment. Any teacher who attempts such work devises her own means of supporting it.

All our Normal College students receive instruction in Domestic Science; but they do not make any use of it in their future teaching. Moreover, a large proportion of our rural teachers have never attended any training school; and, consequently, do not know such a subject as Domestic Science exists.

This year we have seven travelling rural science teachers. Each one is responsible for the agricultural and home-making subjects in about a dozen schools. During the winter months, these teachers will inaugurate Domestic Science classes. By next spring, therefore, we hope to report actual progress.

Already these travelling teachers have done good work in canning. At our last summer session in Truro, every student was required to do pratical work in canning. The travelling teachers gave special attention to this topic. As soon as schools opened in August, they began canning work for the fall school exhibitions. At a number of exhibitions, these teachers gave public demonstrations in this subject. At the school exhibition in Laurencetown there were 700 jars of canned vegetables—the work of the children in one month under the direction of Miss Henderson.

The travelling teachers will also attempt introducing the hot lunch into rural schools. Miss Marsters has already made a start in Avonport. Here is what she says: "Last Monday, a rainy, disagreeable day, the school at Avonport enjoyed its first hot lunch. Two little girls helped make cocoa; two others served as waitresses; two more as dishwashers; while another acted as treasurer, collecting one cent from each pupil present. How the little folk enjoyed it all! The greater part of the equipment was purchased with funds raised at the school exhibition, which, by the way, was a great success. In a sewing lesson which preceded the lunch, the little girls made a holder."

From this you will see that we have passed that vague point where we are "going to do something." We are actually doing something. Though

our beginning is small, we have the workers in the field; and actual results are so near that we view with confidence the possibilities of the present year.

NEW BRUNSWICK

BY FLETCHER PEACOCK, DIRECTOR MANUAL TRAINING AND HOUSEHOLD SCIENCE, DEPARTMENT OF EDUCATION

PRACTICALLY all the urban schools of New Brunswick have departments of household science. Instruction in this subject is given to girls of grades 6, 7 and 8. In the consolidated schools it is also taken up throughout the high school grades. The curriculum further provides that certain phases of the study of the home be taken up in the lower grades.

Until last year no progress was made by this department in extending this practical subject to the rural schools. Thus fully 50 per cent of the girls of the province had not been given the advantages in this connection offered by town schools.

WAR REQUIREMENTS OPENED THE WAY

When the movement for greater food conservation was being launched, this department undertook to mobilize the girls of the province to do their share in the important work. The girls from 10 to 18 years of age were asked to form themselves into "Home Efficiency Clubs" in the different communities. These organizations soon became quite general, especially throughout rural New Brunswick. There immediate object was the canning and preserving of foods; but they have also done a great deal of Red Cross sewing, etc., during the past year. The work has all been headed up in the schools, and the teachers are the local leaders.

It is the policy of this department now, to make these clubs permanent, and through them to take up the various phases of household science work; and it is believed that in this way the subject may be extended even to the remotest districts.

A club supervisor has been appointed, and during the past summer, she had about 30 helpers working with her. The clubs are now active in about 200 localities.

A PROGRAMME FOR THE WHOLE YEAR

A definite full-year programme has been planned, and is now being worked out. The club supervisor or one of her expert helpers aims to visit each school once a month, to encourage and instruct the club. The local teacher is usually the honorary president. Through her help and the monthly visits by the expert, interest is easily kept up, and the work made continuous.

During the canning season food preservation is made the leading task of the clubs. In November and December lessons in bread-making, using substitutes, are given. During the winter months, sewing lessons in Red Cross work are presented, also work in housekeeping and home nursing.

In the spring, problems of cleaning and house furnishing are considered and the girls encouraged to prepare for the canning season, by planting gardens. Thus the problems of each season are dealt with as they appear, and when the community is interested in them.

ALL THE WORK IS PRACTICAL

The methods followed by the club supervisor and her helpers are all practical. Lessons, not simply demonstrations, are given. Take for example—a lesson in canning. The supervisor notifies the club officers a few days before her visit. These officers have the necessary equip-

ment in order at the school or other suitable place. Each girl brings a quantity of fruits or vegetables and her own containers, at the time fixed, and actually performs all the operations under the direction of the expert. The girls are then able to "carry on" in their own homes, and will report at the next visit of the supervisor what they have accomplished in the meantime.

THE NORMAL SCHOOL EMPHASIZES RURAL HOUSEHOLD SCIENCE

During the past year the household science department at the provincial normal school has laid particular stress upon the extension of this subject to rural communities; and the function of the home efficiency clubs in connection with the common schools. This policy will be continued, so that in a very few years a large number of our teachers will be in a position to carry on the domestic science work without much assistance from the travelling experts.

SCHOOL LUNCHES

The value of a warm lunch to pupils in rural districts is appreciated in this province, and the normal school department in conjunction with the club supervisor is working upon the problem of supplying it.

GOVERNMENT GRANTS

In New Brunswick rural domestic science is supported by government grants to the extent of paying one-half the cost of the equipment used, and $50 per year extra to any qualified teacher who devotes not less than three hours per week to the teaching of the subject.

SUMMER SCHOOLS

During the past two years short summer courses have been held for teachers of domestic science. At these the problem of carrying the subject to rural localities has been the leading one dealt with. In future it is planned to extend these courses.

QUEBEC

BY ANITA E. HILL, HEAD, SCHOOL OF HOUSEHOLD SCIENCE, MACDONALD COLLEGE

TO the casual observer it may appear that as far as household science is concerned very little is being done in the rural schools throughout the English-speaking districts of this province. However, a casual glance is never a thorough one, and on investigation and closer observation one will discover that this branch of work has been receiving, during the past three or four years, more and more attention. The interest in the work is sure to increase, as the parents and those in a position to encourage the work are most anxious to see it grow, and are doing all they can to stimulate further interest and at the same time co-operate with the children and aid them in their work.

The provincial government is doing much to encourage the work and to each academy which undertakes to teach household science it gives a yearly grant of $300. This is for the purpose of meeting the expense of equipment, supplying materials for class work and supplementing the instructor's salary.

The work in the province is practically in its infancy and this grant has not been used extensively as yet. The academy at Shawville has installed an equipment this year and the work is being eagerly watched and as a result it is to be hoped that more academies will take up the work next year. In the work given it is planned to have the lessons meet existing conditions as practically as possible and make the girls taking the course real assistants in the home.

DEMONSTRATIONS

As a great number of schools in the province are small, with a small

attendance, it is almost impossible to have household science given in each one. To meet the needs of the children, however, the scheme of demonstrating to them was decided upon and for the past four years this has been carried on with excellent results. The work is done by the school of Household Science, Macdonald College, in co-operation with the Rural Extension Department of the college. Three or four schools will meet at one centre and members of the School of Household Science staff demonstrate to the children; canning, bread-making, cake-making all receive special attention. A bulletin prepared and sent out by the School gives careful directions which the child may use when carrying out the task at home. Sewing is also being taken up and demonstrations in stitch forms, the use of a pattern and the making of a simple garment are given. In the autumn the children bring their sewing, canning, samples of bread and cake (though the latter was cancelled last year because of war conditions) to the school fair, where these products are judged by instructors from the school. Record is kept of the marks obtained and a sympathetic criticism of the work is made by the judge and the children are told where they fall short of the standard as swell as of the merits of their work.

The type of work done each year is improving and it is gratifying to note that after each demonstration the standard of the work is raised. The most important factor is the interest and enthusiasm of the children which speaks well for the future of household science as a school subject, and more than that for the improvement in the standards of living generally.

SCHOOL LUNCHES

The conservation of the child is one of the most vital questions of the day. If the child is to do good work in school and develop into a healthy citizen he must have proper food. A hot cup of cocoa or a bowl of soup to supplement the school lunch has proved its value in numerous schools. Demonstrations on how to prepare such a hot dish and serve it to the pupils are given by the School of Household Science. In addition the lunch box is discussed; its contents, how it should be packed, and under what conditions it should be eaten are all emphasized. The parents are invited to the demonstration so that their sympathy and interest may be enlisted. A list of the simple equipment required is supplied to any school wishing to start the work. The value of letting the older girls prepare the lunch is emphasized. This lays the foundation for future work in household science, and the older boys and girls when giving their assistance are made to feel that they play an important part in the school life. The teachers in the schools have given invaluable help in this work, and the improvement in the lunch box and noon hour has been most marked. The members of the Quebec Homemakers' Clubs have also given much valued assistance—for example, in the Lennoxville Academy the local club has arranged for and supervises the serving of a hot dish at noon. The children have shown a marked improvement and the club has been inspired to continue its efforts. To the women of these clubs much praise is due for the interest they have shown and efforts they have made to improve the lunch hour and to introduce household science into the schools. The teachers have also co-operated and the work of the children shown at the fairs reflects very much the encouragement and help given by the teacher.

The work is not yet as concentrated throughout the province as we might like, but if the interest, faithful service and enthusiasm of the past five years are continued we may hope for greater development. If this country is to have a fine manhood and woman-

hood to carry out its destiny, its young womanhood must have a knowledge of those things which make for wholesome, attractive homes. When is there a better time for them to begin this work than in their school days? Where is there a better place for them to learn some of these practical truths than the school? It is their right, let us see that they have their right.

SASKATCHEWAN

BY MISS FANNIE A. TWISS, DIRECTOR OF HOUSEHOLD SCIENCE, DEPARTMENT OF EDUCATION

THE household science work in the Department of Education is in charge of a director, who has five assistants. Two of these assistants are teaching in the two normal schools, and the remaining three are carrying on extension work in the rural and village schools in the province. These household science teachers accompany the inspectors on visits to the schools where they discuss the various phases of their work with the teachers, the trustees and the parents. To the hearty co-operation of the inspector of schools, is due, in a great measure, the success of their work.

THE NOON LUNCH

In June of the present year, Miss Mary Hiltz began her work in the Yorkton inspectorate, directing her efforts towards the establishing of hot noon lunches. With the inspector, Dr. Anderson, she visited many schools sending word ahead so that the necessary food materials might be on hand. These were always there in abundance when she arrived. She demonstrated the noon lunch before teacher, trustees and parents having the children make the hot dish under her direction. This showed them how easy it is to operate

FIG. 1. EQUIPMENT FOR NOON LUNCH, MOSQUITO CREEK, S.D. 3234, PAMBRUM, SASKATCHEWAN

and how much enjoyment the children get from it. If necessary she would remain two or three days with the teacher in order to assist her. Since Miss Hiltz began this valuable work, upwards of twenty-five schools have begun operating the hot noon lunch. Many of these are in non-English speaking communities and the great benefit of this reform cannot be over estimated.

Miss Ada Neelands went to the Swift Current inspectorate in July. With School Inspector Cram she went from district to district, holding meetings in the day time or in the evening, whichever was most convenient for the people. This brought her into close touch with the parents and teachers. This method was abandoned when the harvest season began. She then visited the schools, talked with the teachers, took a survey of conditions, and, if there were possibilities of development she had an interview with the trustees. During the autumn she hopes to hold public meetings in the school houses where representatives from several districts can be present. Miss Neelands has been successful in having the noon lunch in operation in about twenty-five schools.

Miss Isabel Shaw entered the extension work in September and has been visiting schools in Regina, Moosejaw, and Elbow inspectorates.

ONE PHASE OF THE WORK

Care is taken to impress upon the teachers and parents that although the noon lunch is very important, it is but one phase of household science work in rural schools. The great need of the prairie schools demands attention to this reform first. The water supply, the washing facilities and the general cleanliness of the school are noticed closely and improvements suggested. The method of house-keeping necessary for cleaning after the lunch is served, receives the careful attention of the extension worker. The accompanying figure (Figure 1) shows the lunch equipment in the Mosquito Creek School in the Swift Current inspectorate. The teacher, Miss Ethel Finch, teaches her pupils more than the three "R's." She has added a fourth "R", namely, "Right living". Hers is one of the cleanest schools in

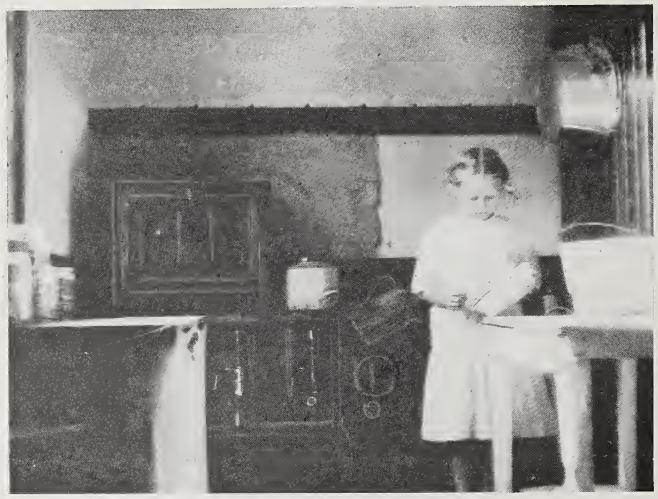


FIG. 2. DOING HER SHARE OF WORK

the inspectorate. It is one-roomed with a main entry in which are found *clean* wash basin and *clean* towels. In one of the cloak rooms is placed the equipment costing $21.66. In the other cloak room is stored the dining-table and the benches, all scrubbed clean. On the dining-table stands a neat row of dinner pails. In Figure 2 the pupil is doing her share in preparing the hot dish for the group (Figure 3). The teacher devotes a half hour each week (from one o'clock to half past on Friday afternoon) to "cleaning up". Each grade has its share in such work as cleaning black-boards and brushes, dusting furniture, washing chalk troughs and cupboards, scrubbing dining-tables and benches, cleaning and polishing stove, washing towels and lunch cloth, cleaning entries and outbuildings. The half hour is ample time and is part of the noon intermission.

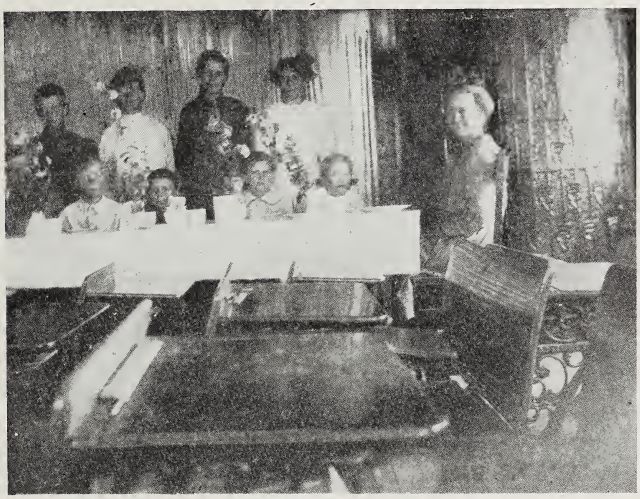


FIG. 3. ENJOYING THE NOON LUNCH MOSQUITO CREEK, S.D. 3234

JUNIOR SOCIETIES

Needlework is not omitted by the extension worker. Type lessons are taught and suggestions given for carrying on sewing in connection with red cross work. Teachers are urged to form junior red cross societies and to give instruction in sewing with application on red cross articles. At the Swift Current School fair held in October there was a large exhibit of sewing, composed of considerable red cross work such as autograph quilts, bags and other hospital necessities and socks. The secretary reported that nearly one hundred junior societies formed in the vicinity.

Up to the present time the Department of Education has given no special grant for installing equipment for household sciences in rural schools in the province. If $40,000 were spent in this way each district would not receive a sum equal to half the cost of equipment. The money could be spent with better results if the services of live home economics teachers were secured for the purpose of visiting the schools and the homes of the people. The personal touch is the strongest agency in shaping ideals, and we know that parents are willing to promote the best interests of their children, when once they realize what those interests are.

ALBERTA.

BY G. FRED MCNALLY, SUPERVISOR OF SCHOOLS

IN the course of studies of the Province of Alberta, work in household science appears for all schools beginning with grade V. In Grades V and VI the time is entirely devoted to sewing. The aim of the course is to inculcate habits of neatness and of work; to encourage a respect for sewing as a part of woman's work; to give the girls some power in the selection of proper materials and some ability to care for their own clothes.

In Grades VII and VIII the work deals with cooking, home nursing, first aid and simple house management. Provision has also been made for courses in this subject in the High School. In both Grades IX and X the courses are complete, while a course for Grade XI for both boys and girls is in process of preparation.

The University of Alberta has opened a Department of Household Science this year with an experienced organizer and teacher from the Manitoba Agricultural College at its head. Already the classes are crowded. It may be said this subject is receiving due recognition throughout the Alberta educational system.

From the above it will be seen that the work of Grades V and VI is quite possible of accomplishment in the ordinary rural school and is being carried out in a great many of them.

THE SYSTEM ADOPTED

Systematic instruction in cooking has made little headway outside the urban centres. In rural schools it has been considered more practical and much more valuable to link up this work with the preparation and serving of a hot dish in connection with the noonday lunch.

In the normal schools the teachers in training each prepare and serve practically all the dishes which are recommended by the Department as suitable for the rural school lunch. In addition they discuss methods of securing supplies, necessary equipment, and the aims to be kept in view in serving this dish.

At the 1918 session of the Summer Schools instruction was given in textiles; theory of foods, first and second years; household art, first and second years; household management, first and second years, and methods in both household arts and household science to about eighty students. In this way those teachers in rural schools who are progressive and anxious to make their work effective prepare themselves for this and similar types of work.

A PRACTICAL DEMONSTRATION

One afternoon during the session the class in household science I prepared about forty lunches, packed them in boxes and pails, and invited the Deputy Minister and the inspectors to the demonstration. After some explanations of the purpose of the demonstration one of the members of the class proceeded to make cocoa for the company, explaining as she went along, how the various steps could be fitted into the ordinary school programme. At an imaginary twelve o'clock the visitors proceeded to the shelf at the side of the room and each secured his lunch pail or box. In the meantime other members of the class had spread serviettes on the desks and distributed cups and spoons. The cocoa was then served and the lunch proceeded in rural school fashion. At this time an animated discussion took place as to topics of conversation which a teacher might introduce and make the meal easy and homelike. So delightful was the luncheon and the serving of the hot dish so simple that the inspectors pledged themselves to urge boards everywhere to provide such facilities for the children.

WOMENS' ORGANIZATIONS HELPFUL

This movement, along with other features of the course in household science, has received great impetus from the whole-hearted support of the two great Alberta organizations of rural women, viz., Women's Institutes and United Farm Women. On page 816 of the August number of THE AGRICULTURAL GAZETTE will be found a description of the way in which this work is carried out in one Alberta school. Without doubt this scene could be duplicated in scores of rural schools in this province to-day.

There is in the press just now a bulletin entitled "Rural School Lunches," which will be available early in November. This is intended as a handbook of instruction as to organization for both teachers and trustees. It is the belief of officials of the Department that if trustees can be made aware of the great value of this hot dish and the simplicity of the equipment required that provision for it will soon become general.

During these years good foundation work is being done in preparing teachers for instruction in household science. When the war is over and more money available for equipment and specialists this subject will without doubt come to its own. Some day it will be possible for young women to elect it as a subject to be carried throughout the high school with as respectable standing as algebra.

BRITISH COLUMBIA

BY JOHN KYLE, ORGANIZER OF INDUSTRIAL AND TECHNICAL EDUCATION

THE term domestic science in British Columbia includes the study of cookery, laundry-work, sewing and knitting.

For installing the equipment necessary to teach such subjects the Council of Public Instruction pay to the Board of School Trustees fifty per cent of the cost of equipment up to a sum not exceeding $500.

Every instructor must hold a British Columbia instructor's certificate of qualification. Each applicant for this certificate must have had two years' training, hold a satisfactory diploma from one of the recognized training colleges in Canada, the United States, or the United Kingdom, and hold a public school teacher's certificate, or have had other approved professional standing. Every application for a certificate must be accompanied with the usual fee of $5 and a satisfactory testimonial certifying to the good moral character of the applicant.

Rules relating to domestic science:

1. Where domestic science centres are established, attendance is compulsory and must be continuous throughout the school year.
2. A three years course should be taken in public schools.
3. All courses of work in domestic science must be submitted to the Department of Education for approval.

Diplomas are awarded by the Department of Education to pupils who complete the three years' course in domestic science.

Female candidates for high school entrance examination from schools in which instruction has been given, must hold domestic science diplomas or fulfil departmental requirements as to attendances and work.

The total per capita grant for school teachers is also paid for domestic science teachers, viz.:—

To cities of the 1st class...	$ 360
To cities of the 2nd class..	425
To cities of the 3rd class..	465
To rural districts.....	480

In addition to this a supplementary grant of one dollar for every dollar which the salary of the teacher is increased is also paid, but in no case must this supplementary grant to be paid by the Government exceed one hundred dollars.

Owing to teachers coming from varied training schools they adopt

many different methods of attacking the lessons in cookery, but it may well be said that they usually employ those which are more or less scientific in character, and discard methods of a purely empirical nature. Sewing and knitting have made great advancement in recent years, and laundry work has its due share of the time allotted to it.

Household science is taught to the student-teachers attending Normal School in Victoria. The necessity of preparing classroom teachers who can conduct lessons without the assistance of a specialist is understood to be the only method of carrying the household science type of training to rural districts in British Columbia.

There are in this province, 47 centres, 38 instructors, 4,867 pupils from elementary schools, 1,184 pupils from high schools, all engaged in the study of household science and domestic economy.

No summer school for school teachers was held this year, but in former years an extensive course was arranged in cookery, needlework, sanitation, and hygiene, in order to prepare teachers primarily for the work to be done in rural schools.

A three-year high school course in household science worthy of mention is that organized in King Edward High School, Vancouver. The subjects embrace the following:

Household Science..	Physiology and Hygiene, Dietetics and Cookery. Physics and Chemistry. Dressmaking and Millinery.
Household Art.....	Drawing and Design. Art Handicrafts.
English.....	Literature. Composition.
Arithmetic and Mensuration.	Simple book-keeping. Business forms and usages.
Vocal music and appreciation.	
Physical Culture.	

It will be seen from the foregoing that the Education Department of British Columbia today is keenly alive to the importance of effectively training the prospective home-maker.

SCHOOL FAIRS IN 1918

PRINCE EDWARD ISLAND

BY J. E. MCLARTY, DIRECTOR RURAL SCIENCE DEPARTMENT, PRINCE OF WALES COLLEGE

DURING the year 1918 School Fairs have registered a marked advance so far as numbers and educational value are concerned. Parents, teachers and pupils are enthusiastic in their praises of the great benefits derived from their successful carrying out. We have endeavored to make the fair day the finale for a season's work. In order to be a contestant at one of these fairs, the pupil must begin in the early spring to plan to produce material for exhibition. With the exception of two classes, namely, grains and fruits, pupils were required to exhibit products which were the direct results of their own labour. In the case of grains, the pupils were required to make the *selection* from the standing crop. This in itself we hope will be the beginning of better grain being selected for seeding purposes. Similarly with the fruit, the pupils were required to make the selection from the home orchard.

PROGRESS DURING 1918

The fact that the number of fairs held during 1918 was more than double the number held in 1917 speaks for the increased interest taken in this popular form of rural life teaching. The enthusiasm is so great that in many places local fairs were held with but one school participating in order to lay the foundation for a larger and more successful organization for 1919. Already

many requests have been made by teachers for school fairs to be held in their district during the coming season.

Reports from only 18 of the 30 school fairs have been received. These enable the following report to be made:

Number of pupils enrolled.....	3,213
Number of pupils exhibiting.....	1,903
Estimated number of people in attendance.....	5,410
Number of exhibits.....	6,009
Number of prizes awarded.....	2,355
Value of regular prizes awarded....$	33,780
Value of special prizes awarded....	12,050

ORGANIZATION

The following from School Circular No. 5 Revised will explain clearly the system followed in organizing:

1. The work shall be radiate from the inspector as a head assisted by the Agricultural Representative when necessary and possible. The teachers of the schools is a fair group shall assist the inspector. After the organization the pupils and teachers shall carry out all details in connection with drawing up a suitable prize list and arranging for any special features in connection with the fair.
2. The organization and management shall be carried out by means of a central committee made up of three pupils from each school.
3. An advisory committee shall consist of one teacher from each school, together with one trustee from each school.
4. The central and advisory committees shall meet before May 1st to elect their officers.
5. The following officers shall be elected: Honorary President, President, one Vice-President from each school, a Secretary, an assistant Secretary and a Treasurer. All offices except those of Honorary President and assistant secretary shall be filled by pupils. A teacher or any ratepayer may be appointed as assistant secretary.

The choosing of centres is left in the hands of the inspector as we feel that he knows the inspectorate better than any one else, and is therefore better able to choose the most suitable centres and make the best arrangement of schools. Inspectors were required to notify the Rural Science Department, Prince of Wales, College, before April 1st the centres at which school fairs were to be held. The committee in charge of the fair were required to submit a report on their complete organization including a copy of their prize list before June 15th.

ASSISTANCE GIVEN

All school fair centres organized under the conditions as laid down by the Rural Science Department, Prince of Wales College, were given the following assistance.

A representative of the Rural Science Department met with the school fair committee before June 15th to assist with the arranging of a prize list and to give any suggestions possible in regard to the successful carrying out of the fair.

As soon as a copy of the prize list was received at this office, several copies were sent to each school taking part in the school fair so that all pupils were working on a uniform prize list.

All the necessary material consisting of entry tickets, prize tickets, secretary's entry book, exhibitor's badges, officers' badges and printed prize tickets for the sports were supplied to all centres.

ARRANGING OF DATES AND SUPPLYING JUDGES

In order to cover the work involved in the shortest time while the weather was favorable, the school fair centres were arranged in groups of five centres in each. A group of judges consisting of two gentlemen and one lady went along with an inspector and spent a week on school fairs. By this arrangement it was possible to have the work completed within one week.

PRIZE LISTS

Every school fair committee drew up a prize list for their own centre. A suggestive prize list was furnished for their guidance. This committee met early in the year to arrange the prize list so that intending compe-

titors might make arrangements to grow whatever they wished to exhibit.

The prize lists usually contained the following classes: grains, roots, garden vegetables, flowers, fruit, canning, cooking, sewing and knitting, manual training, live stock and poultry, collections, school work, contests and sports. The classes were again divided into the necessary sections. It was strongly impressed upon each committee that the prize list should be limited and made to suit their particular community.

In the class of live stock and poultry were included, calves, pigs and poultry. The calves exhibited came under the rules of the Bankers' Competition, as this organization extended their scope to take in school fairs.

During the spring of 1918 Pig and Poultry Clubs were organized at many centres and consequently under the rules of this class only members of these regularly organized clubs were allowed to compete. This we hope will be an incentive for the organization of more live stock clubs for another year.

THE AWARDING OF PRIZES

The question of the awarding of money prizes is one that is causing considerable discussion. It is strongly felt that the money prize is inducive to considerable dishonesty among the grown ups at our regular exhibitions. When this tendency is prevalent among the grown ups, it is felt that the same will be inculcated among the children even to a greater degree, encouraged as they no doubt will be by the parents. At a good number of our fairs only prize tickets were given and it is strongly claimed by those in charge that the enthusiasm was just as high and that the educational value was superior to that evidenced at fairs where money prizes were given. The question of money prizes also resolves itself into this question—Is it not better to have all money for prizes go to the school rather than to the individual? This idea no doubt will instil into the pupils' minds the idea of loyalty to the school rather than the selfish spirit of winning for the individual.

SPECIAL FEATURES

Each committee was encouraged to use their initiative in introducing special features. Such features as decorated wagon, decorated automobile and decorated bicycle parades were common. Marching and the singing of patriotic songs by the different schools was also popular. As a number of centres interschool games such as baseball and basketball proved very intesresting and exciting.

EDUCATIONAL VALUE

It is admitted by all who have been priviledged to attend any of the school fairs that their possibilities for educational purposes are almost unlimited.

NOVA SCOTIA

BY L. A. DEWOLFE, B.A., DIRECTOR, RURAL SCIENCE SCHOOLS

IN Nova Scotia this year 231 schools exhibited the produce of their gardens and their homes. Of these 28 were one-room schools, holding their own local exhibitions. The remaining 203 exhibited at 29 different centres, covering from 4 to 30 schools each.

"Canning" was a strong feature at many of the exhibitions. Lawrencetown led the province in this line, exhibiting 700 jars of canned fruit and vegetables.

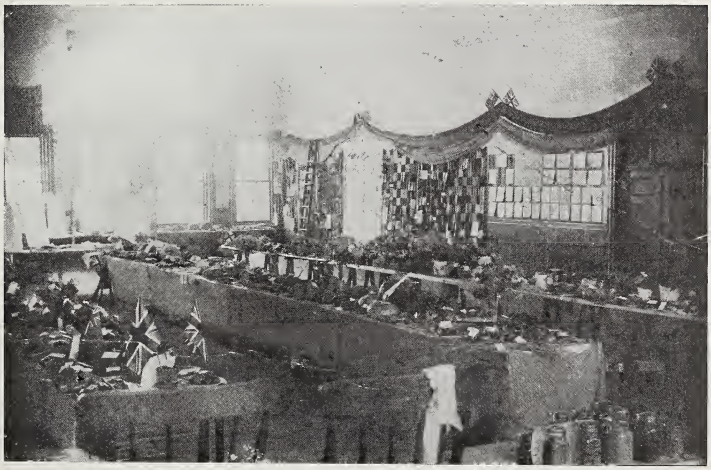
Demonstrations in "Milk Testing" were carried on by the teacher at many exhibitions. To prepare for this work 15 teachers took a special course in Milk Testing at our Summer School in Truro last term.

A new departure so far Nova

Scotia school exhibitions are concerned, was the exhibition at Glace Bay. That town had a four-day exhibition combined with other school activities. It was the biggest affair of its kind yet held in the province. It included children's exhibits of all kinds, singing by the children, competitive school sports and athletics, talks on Agriculture, Band Concert, Cadet March and review, presentation of S.O.S. medals, and graduation exercises of the High School. At the close of the Fair, the children's vegetables were sold by auction.

Winners at small fairs have not brought their material together at large fairs. Those who exhibit locally, however, frequently send the same or similar exhibits to the County Fair.

To show the growing interest in exhibitions it is only necessary to point out that $2,500 was raised locally for the prize lists. A number of schools raised $75 each. Smaller schools on the other hand often raised not more than $5. The Government helped the weaker sections. Approximately 75,000 people saw a school exhibition somewhere in the province.



SCHOOL FAIR EXHIBIT AT WINDSOR, N.S.

NEW BRUNSWICK

BY R. P. STEEVES, M.A., DIRECTOR OF ELEMENTARY AGRICULTURE

TWENTY-ONE school fairs were held in New Brunswick last year and were arranged in a circuit commencing at Moncton, September the 2nd, and ending at Petitcodiac on October the 4th.

In almost every locality where a fair was held, the interest, both among children and people, amounted to enthusiasm. Many who had not been in touch with school work since early youth, attracted by features related to their own occupation, found it pleasant and profitable to spend a few hours in thus giving encouragement to the children. The crowds of citizens who have attended have caused the pupils of the schools to recognize that what they are doing is appreciated, and this union of thought and action, practically expressed between young and mature,

cannot fail to give a deeper purpose to the preparation the schools afford for higher and more resourceful citizenship.

BROADENING INFLUENCE

While the nature study and agriculture part of the school course, through the school garden, with the home plot and poultry project work growing out of the instruction given at the schools, provided the major quantity of the exhibits and formed the basis on which interest was developed, results of other study contributed to broaden the influence exerted. Writing, drawing, composition (essays), pressed plants, collections of seeds and insects, maps, plans of home properties, domestic science, and manual work in wood, all had their place at most of the fairs. Only by consolidating the interweaving practical outdoor application with school-room study, can the great power the school possess as for cummunity building be exerted. The school fair calls the attention of the ratepayers to their school, to its local value and to the importance of the teacher's office. It is a sort of clearing house, an annual summing up of results in a form that can be seen and handled. It trains pupils to put themselves into touch with the things that occupy the time of the people, and thus helps to make the work of education to be the early steps of men's and women's employments.

UNITY MORE MARKED

To a much larger extent than last year, union among districts for school fair work has been effected. In one case, at Sussex, nine districts cooperated, giving the fair the rural and town features in healthy combination. At Chatham, Sackville, Hartland, Hampton, and other places, the same principle was followed. Even in purely rural localities the same plan worked admirably. At Cambridge five, Young's Cove Road three, and at Jacksonville, two districts united with excellent results. Training among the young of this kind cannot but be beneficial. Knowledge of each other, obtained by actually uniting in educational activity, will conduce to break down local jealousies and sectional feeling and to create union co-operation.

EDUCATIONAL EFFECT

Last year preparation for fair work extended over a longer period of time. Through the winter and spring the fair idea was kept to the front and used as an impelling power to increase interest in regular school work. This also helped to connect with production, knowledge, and instruction. It generally occurs that the best students have the best exhibits, not only of school room work, but of garden products. The scientific side of production is thus emphasized. The complex nature of productive industry is shown to need not only art, the practical, but also science, observation, study and experimentation.

LOCAL JUDGES

Our plan has been to, so far as possible, obtain judges from the localities where fairs are held. We find that by so doing there is a closer connection with resident people. The official in charge with the teachers, acts as interpreter of the prize list, and is always present to aid with his judgment as becomes necessary. Exhibitors are given a number which is placed on each exhibit. No names appear on exhibits. Judges have a record sheet on which they mark the number opposite the prize awarded. From these sheets and the registration paper the amount of prizes awarded each exhibitor is made out.

RESULTS RATHER THAN PRIZES

Prizes are purposely kept small. The feature kept prominent is edu-

cation, not the amount of money to be obtained. To the three making the best showing at each fair, certificates of award are granted. It is suggested that those who receive such certificates have them framed, and that they allow them to be hung in the school room for the remainder of the school year, thus serving as an incentive for further continued effort.

CONTINUATION WORK A NECESSITY

A noteworthy fact in connection with last year's school exhibitions was that in several places—Jacksonville, Andover, Kingston, and Chatham—the Boy's and Girl's Community Clubs Poultry and Live Stock, under the direct charge of Agricultural Department officials, have also made creditable showings. Such work indicates the trend of thought of the people. There is a period between the time of leaving school and mature age when many young people are lost to the country, through lack of much to interest them. This form of continuation work is much needed, and every encouragement should be given our youthful citizens in the productive industries, to keep them in touch with the schools, and carry on their activities in the communities under the most approved and scientific methods. While the efforts of those of school age can best be carried on through the school as a centre, care and attention should be given that the older boys and girls leaving the school should have their interest in the school maintained by practical forms of continuation work.

ONTARIO

BY R. S. DUNCAN, B. S. A., AGRICULTURAL REPRESENTATIVE SUPERVISOR

THE school fair is one of the best means of arousing interest in the work of the school. It creates in the boy and the girl a greater love for farm work, and is a big factor in bringing the school work in closer touch with the home life of the pupil. During the past few years the movement has been given a very severe test. It has gotten a mighty stronghold of the community and is gaining in popularity.

School fairs have registered a marked improvement over former years, particularly is this true of the quality of the exhibits. This may be attributed, first, to the pupils' experience in selecting produce for the fair, and, secondly, to an awakened

FOALS AT CENTREVILLE SCHOOL FAIR

interest on the part of teachers and parents. A special part of the programme on Fair Day has been set aside for the judges to give reasons for their placing. The desirable type in vegetables and the manner of preparing exhibits were pointed out and emphasized. This had a wonderful effect on the exhibits the following year, the quality being much superior and the arrangement more attractive.

STATISTICS OF THE FAIRS

During the past season 307 fairs were held in the province of Ontario,

		bush.
Oats	O.A.C. No. 72	82¾
	Banner	12
Barley	O.A.C. No. 21	57
Wheat	Marquis	42
Potatoes	Green Mountain	858
	Irish Cobbler	482
		lb.
Field Peas	Early Britain	495
	Arthur	450
	Prince Albert	30
Garden Peas	Thomas Laxton	756
		packages
Mangels	Yellow Leviathan	4,240
	Bruce's Giant	365
	Our Ideal	440
	Yellow Intermediate	560
	Mammoth Long Red	125

DAIRY CALVES, ODESSA SCHOOL FAIR

and 2,868 schools were included in the movement, with a total of 71,086 children taking part. This is an average of 9 schools for each fair and 25 pupils for each school. It is estimated 84,338 children and 88,908 adults attended the fairs, making a total of 173,246. The pupils had 66,613 home plots and made entries to the number of 115,531.

The Department of Agriculture purchased and distributed in small packages to the pupils, the following quantities and varieties of seeds:—

Turnips	Purple Top Swede	725
	Garton's Model	800
	Carter's Invicta	1,880
	Good Luck	430
	Garton's Keepwell	125
Beets	Detroit Dark Red	6,860
Carrots	Chantenay	8,120
Onions	Yellow Globe Danvers	6,910
Parsnips	Hollow Crown	3,920
Asters	Giant Comet	8,765
Sweet Peas	Giant Spencer	5,165
Phlox	Drummondi	4,295

Special precautions were taken to purchase the best quality of oats, barley, wheat and potatoes which could be obtained. This tended

towards greater uniformity, and resulted in many farmers getting a start in seed of the highest quality of the best varieties. Agricultural Representatives have been shown whole fields of grain and potatoes which had as their origin the small package of seed distributed to the pupils of the schools during the past few years. The value, therefore, of the school fair work in the distribution of pure seed through the county must be recognized.

The number of eggs of a bred-to-lay strain of utility breeds of poultry distributed during the past three years may be summarized as follows:—

	1916	1917	1918
Barred Plymouth Rock	7,357	8,940	9,670
Rhode Island Reds....	406	293	140
White Wyandottes....	295	50	130
Totals.....	8,058	9,283	9,940

A certain number of the eggs distributed were obtained from the Poultry Department of the Agricultural College at Guelph, but the greatest quantity was secured from the Poultry Breeding Stations which have been established in each county. The birds in the Breeding Stations are of the bred-to-lay strain and are mated with cokerels secured through the Poultry Department at the Ontario Agricultural College. Each station is inspected and the flock culled in order to eliminate the poor birds. The eggs from these breeding stations are in great demand from farmers in the community, and invariably command a much higher price than the eggs from the average neighbors' flock.

CHILDREN'S CHICKENS, ODESSA SCHOOL FAIR

CLASSES OF EXHIBITS

The classes of exhibits at the fairs might be summed up as follows:—

1. Products from home plots from seed supplied.
2. Poultry and Live Stock.
3. Collections of nature objects such as mounted weeds, weed seeds and insects—beneficial and injurious.
4. Manual Training and Household Science Work—cooking and sewing.
5. Collections of fruit.
6. Educational work including essays, maps, drawing, writing, art, etc.
7. Miscellaneous and contests of various kinds.

THE DAY'S PROGRAMME

The programme for the day would be somewhat as follows:—

Until 10.30 a.m. Placing of Exhibits; this work to be in charge of Teachers and Directors.

10.30–11.00 a.m. Judging calves, colts, and lambs.

11.00–12.00 a.m. Live Stock Judging Contest and Girls' Knitting and Sewing Contests.

12.00–12.30 a.m. Lunch to be served in picnic style.

12.30–1.00 p.m. Address of Welcome—Public Speaking Contest.

1.00–1.30 p.m. School Parade.

1.30–3.00 p.m. Programme of Sports, Contests and Competitions.

THE PRIZE MONEY

The total prize money for each fair varied from $40 to $125, depending upon the number of schools taking part and the generosity of the trustee boards. All prize money is raised locally, the school sections, township and county councils, and public spirited persons, all contributing a share. No admission is charged and no entry fee is received.

The school fairs have been managed in the past by a Rural School Fair Association composed of representatives from each school with the Agricultural Representative as manager. The pupils get a splendid executive training and they are always ready for the several committee meetings which are held during the season.

FIRST PRIZE WINNER IN LENNOX, ONT., HOME GARDEN, 1918, WITH 99 POINTS

DISTRIBUTION OF MATERIAL

Now as to distribution of the material to the pupils. During the past season, the greater part of the seeds and eggs were distributed through the mail by parcel post, or sent by express. In some sections, however, use was made of the motor, which always afforded an opportunity for the Agricultural Representative to visit the school and give a little talk to the pupils on school fair work. The system of sending eggs by parcel post has been endorsed by practically all our representatives. Some four or five reported the hatch not as satisfactory in their county, due no

doubt to carelessness in handling by rural mail carriers.

THE PATRIOTIC FUND

"Children's Tag Day" at the fairs this past fall resulted in the sale of about 60,000 patriotic buttons, with a total of nearly $2,500 collected for the Rural School Fair Patriotic Fund. This money will be used for some special and worthy object which will be decided upon at a later date.

NEW FEATURES

A few new features, particularly in regard to contests on Fair Day, were introduced at some of the fairs attended by the writer. These included a boys' car-driving contest; a spelling match, using words in relation to agriculture and home economics; a fancy drill; solo and chorus singing competitions; baby contest; boys' carpenter contest; girls' knitting and

SCHOOL PARADE, RURAL SCHOOL FAIR, CAYUGA, ONT.

FIRST PRIZE PLOT OF OATS, HALDIMAND COUNTY, ONT.

sewing competitions, and a Babylonian Health contest. An innovation at one fair was a prize given for the best decorated float that illustrated some phase of agricultural production, food conservation, or similar subject. In the School Parade the float idea was modified somewhat, and pupils were permitted to arrange themselves in any formation which would help depict their subject.

PRIZE-WINNING COLTS AT LAUREL, DUFFERIN CO., ONT., SCHOOL FAIR

INSPECTION OF THE PLOTS

Inspection of the plots was again discontinued by the Department, but in the majority of school fair districts arrangements were made to have this work done voluntarily by someone locally. The trustee board usually made arrangements for some capable person in the locality to do the judging, the Representative supplying score cards giving instructions and finally paying the prizes awarded.

DISTRICT FAIRS

During the past season there were four district school fairs held in the province, where the winners at the smaller fairs were brought together. These were held in the counties of Oxford and Wentworth and the districts of Algoma and Manitoulin Island. Generally speaking prizes were offered by the Agricultural Society where the fair was held in the central part of the county or district. The 1st, 2nd, and 3rd prize exhibits from the different school fairs in the county competed at the district fair.

BOYS' DRIVING CONTEST, HAYSVILLE SCHOOL FAIR, WATERLOO CO., ONT.

Reports would indicate a great interest was taken in the larger fair and the quality of the exhibits was in

many cases superior to those exhibited at the regular fall fair held by the Agricultural Society. The greatest difficulty in staging a fair of this nature is that most of the school fairs are held at a considerable distance from where the district fair was held, and transportation facilities in some counties are not of the best. The idea of the district fair is to be commended, for it stimulates the boys and girls to do their best in caring for their plots, in order to produce the best, and preparing their exhibits for competition, because by taking a prize at the district fair they are winning greater honours than by taking a prize at their local school fairs.

CHAMPIONSHIP JUDGING CONTEST

The special feature of the district fair in Oxford County was the Championship Live Stock Judging Competition, where eight teams of three boys competed for the honours. The boys showed evidence of having had considerable coaching in all classes of live stock, and the very fact of their competing would give them added interest in the live stock on the home farm. The prize for the winning team was a silver cup and a pure-bred Yorkshire pig to each of the boys. The boys in the second team are to be given one hundred Barred Plymouth Rock eggs for hatching in the spring, and the boys in the third prize team fifty Barred Rock eggs.

LEARNING TO DO BY DOING

The various fall fair boards have set aside a certain sum for special classes at the fairs for children's exhibits. Competition is keen and invariably the plot products surpass those exhibited in the regular classes. The boys and girls have as their motto: "Learn to do by doing."

MANITOBA

BOYS' AND GIRLS' CLUB FAIRS

BY S. T. NEWTON, DIRECTOR, AGRICULTURAL EXTENSION SERVICE

THE first Boys' and Girls' Club fairs were held in Manitoba six years ago, and the best tribute that could be paid to this movement is that the eight communities which held fairs at that time have continued to hold them ever since, and this year's fairs were better than ever. Of the 165 clubs that have been organized since that date, all held successful fairs this year, except four or five whose dates came after October 12th, and had to be postponed indefinitely on account of Spanish influenza.

Owing to harvesting and threshing operations extending right up to winter, it is difficult to find a time for the fairs when the farmers are not busy, and this year, with many of the older members of the clubs doing men's work on the farms, a large number of them were not able to bring to the fair the result of their summer's spare-time activity.

Most of the fairs were held during the last week of September and the first two weeks of October, and the number of people who took time off from their harvest operations to examine the exhibits was very gratifying, there being no less than 22,000 adults and 28,000 children at the fairs.

FOOD SIDE OF THE WORK

Ever since the war broke out, the food side of club work has been emphasized, consequently the special appeal made last spring for food found the Manitoba boys and girls fully organized for effective work, and the results of the summer's work as shown by the exhibits at the fairs, indicate that few members were idle.

The number of exhibits in the various food classes were as follows:—vegetables, 11,070; poultry, 3,635; pigs, 1,954; calves, 826.

We felt that production without conservation would be a mistake, and vegetable canning was emphasized throughout the past year, with the result that over three thousand club members had exhibits at the fairs, and close on five thousand had spendid exhibits of good, plain home cooking.

JUDGING CALVES, DAUPHIN, MAN., BOYS' AND GIRLS' CLUB FAIR

PRODUCTION OF REGISTERED SEED

Owing to the fact that Manitoba holds a large number of community seed grain fairs, and an extensive provincial soil products exhibition, many boys, and some of the girls, have been very much interested in growing registered seed, and over 500 exhibited sheaf and threshed grain at the fairs, and the best exhibits will be brought together at the soil products exhibition for provincial honours.

PRIZE PIGS

The interest taken in the pig and calf raising competitions by the Canadian Bankers' Association, the Dominion Department of Agriculture, and the Manitoba Swine Breeders' Association, resulted in some rather remarkable results. One boy, Edgar Van Wyck of Roland, raised two pigs which were six and a half months old on the day of the fair, and tipped the scales at 670 pounds. The second best pair was raised by Donald Dalgleish of Grandview, and weighed 600 pounds. Another pair raised by Stanley Hocken of Brookdale weighed 627 pounds, but they were eight months old. Thirty club members raised pairs of pigs weighing more than 500 pounds, and ninety-two had pairs that went over 400 pounds on the day of the fair.

The places having the largest showing of pigs were—Dauphin 108, Virden 60, Grandview 54, Brooklands 54, Portage 52, Brandon 42, St. Rose du Lac 40, Oak Lake 36, and Roland 58.

DIVERSIFIED EXHIBITS

Not all the contests applied to food. There were 17,000 exhibits of school work, 6,162 exhibits of

sewing, 815 dairy exhibits, 1,148 of woodworking, and 887 weed exhibits.

In a membership of 25,000 there is naturally a wide diversity of tastes. For this reason, twelve contests are included, so that there will be something to interest everyone, However, club members are not encouraged to take more than four contests.

In a few inspectoral divisions where there are medium-sized clubs, the prize-winning exhibits are brought to a central town for sweepstakes honours, and for the Rockwood club member making the highest score where they have branches.

Needless to say, the competition for these 100 free trips was very keen. The winners were to have left for Winnipeg on November 11th, but the trip has been postponed on account of the influenza until February 17th, when it is hoped that a whole week will be spent in instruction and sight-seeing at the college.

To encourage vegetable canning, the winners at six summer agricultural fairs competed at the Winnipeg garden show in September, their

SOME OF THE 72 PIGS SHOWN AT DAUPHIN, MAN., SCHOOL FAIR

district, even last year, a special train was run to accommodate the young people.

FREE TRIPS TO THE AGRICULTURAL COLLEGE

As a further encouragement to the children to produce food, a leading firm offered a free trip to the Agricultural College for the boy or girl who obtained the highest score in certain contests in each inspectoral division. The Manitoba Swine Breeders' Association offered a similar trip for the winners in the pig raising contest, and the Canadian Bank of Commerce and the Merchants Bank gave free trips for the travelling and living expenses being paid by the Department of Agriculture.

ASSISTANCE GIVEN

It would be difficult to enumerate all the resources from which assistance is given to Boys' and Girls' Clubs, but we will give a few:—

1. *Financial*—Funds for seeds, prizes, etc., are generally provided by the various school trustee boards. In some municipalities the municipal council gives a grant sufficiently large to cover the expenses of all the clubs in the municipality. The Department of Agriculture pays one-third of the amount of money actual-

ly paid out in cash prizes, and, in addition, a little over one-half in the purchase price of seeds and eggs.

2. *Personal assistance*—Possibly the school inspector has devoted more time to club work than anyone else, as, in addition to organizing the branch and central clubs in his division, he was present at all of the fairs and took a very active part in directing the energies of the young people. At several centres the bank managers were active in helping along the work of the club. The Agricultural Representative was also an important factor, as were also hundreds of teachers, and scores of business men and women.

The Extension Service provided judges for all of the fairs, and assisted the teachers and inspectors in organizing new clubs. Two-thirds of the entire Agricultural College staff devoted all their time to club work during the three weeks that the fairs were being held.

In all club work the parents have taken a deep interest, and encouraged the children by assisting them to get the best kind of stock, and, better still, by permitting their boys and girls to actually own the pigs, or calves, or chickens, which they were caring for. In fact, not less than 90 per cent of the exhibits at the fairs were actually owned by the children who exhibited them. Where children did not have the money to buy the calf or pig outright, the bank, or some other agency, loaned them money. The Winnipeg Rotary Club alone financed 50 children in buying pigs.

If we were asked to name the one feature that will do most to make Boys' and Girls' Club work a success, we would have no hesitation in saying, "let the boy or girl actually own the pig, or calf, or chickens, that he or she is caring for throughout the summer".

CANNED VEGETABLE EXHIBIT AT DAUPHIN, MAN., BOYS' AND GIRLS' CLUB FAIR

A SAMPLE SCHOOL FAIR

BY CHAS. MURRAY, B.S.A, AGRICULTURAL REPRESENTATIVE, DAUPHIN

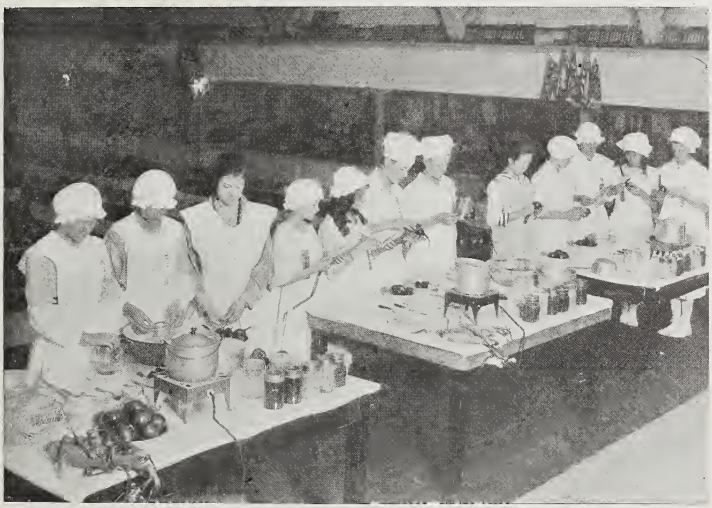
THE third annual fair of the Dauphin Boys' and Girls' Club was held in the Agricultural Fair Grounds on October 4th. Despite the fact that many of the farmers were busy threshing, which prevented fully one-third of the children attending with their exhibits, there was a very satisfactory showing, as the following figures show:

Number of schools represented	16
Number of Exhibitors	223

The number of exhibits were in:

Pig raising	36
Calf raising	12
Poultry	72
Grain Growing	2
Cooking	91
Gardening	203
Sewing	70
Canning	80
Noxious Weeds	13
Dairying	17
Woodworking	2
Booklets and Essays	2
Total	600
School Work (est.)	200

The pig raising, calf raising, poultry, gardening, and canning contests were specially worthy of comment, although in virtually all the contests there was strong competition.



CHAMPION CANNING TEAMS FROM GLADSTONE, DAUPHIN, TEULON, PORTAGE LA PRAIRIE, AND CHARLESWOOD, MANITOBA

Spendid assistance was given the club executive by the ladies of La Verendrye Chapter I.O.D.E., who decorated the hall and served a hot luncheon; and also to the Home Economics Society, who took charge of the canning, cooking, sewing, and baking contests. In spite of the unfavourable weather there was a large attendance—upwards of 1,200—at the fair and the greatest enthusiasm was everywhere manifested.

SASKATCHEWAN

BY A. H. MCDERMOTT, DIRECTOR OF SCHOOL AGRICULTURE, REGINA

THE Department of Education this year required each school fair executive to report showing registration of each teacher present, number of pupils and exhibits, financial statement, and nature of evening, or other, entertainment, if such were held. These have been found useful and necessary in tabulating and noting progress of the movement, which is comparatively new in this province. The Department does not withhold grants to districts where schools are closed on the day of a school fair if the teacher is registered as attending. To date seventy reports have been returned showing an attendance of 432 teachers and upwards of 17,800 pupils, parents, and others.

THE PROGRAMME

Well-balanced programmes were arranged in most places. The exhibits were largely school-garden products and class-room work. In many cases stock entered in the Canadian Bankers' Associations competition, or other local stock or poultry competitions and club work were most interesting features. A long list of sports was run off while judging was being done or later in the day. An afternoon or evening entertainment with lantern lectures public speaking contests, presentation of prizes or medals, or addresses by prominent educationalists, completed the programme.

It seems regrettable that money prizes should be so frequently offered, and, till such time as this can be corrected, it presents a difficulty met in various ways by organizations. Among the devices for raising funds were: a ten dollar fee for each school room of that district competing, to be paid by the board of that district, an entry fee for each exhibitor, a fee for each teacher in the association, or even an admission fee charged each non-exhibitor entering the fair grounds. The last of these should be entirely prohibited.

In some cases a central fair was held for competition in prize exhibits at fairs held previously in other parts of the inspectorate. These were doubly valuable and stimulating, since they were held at the same time and place as the teachers' convention.

In the southern part of the province, several live stock judging competitions proved most successful with boys and girls. This feature, it is hoped, will be enlarged and developed in other exhibitions. As time goes on the need for reliable educational judging on a standard basis becomes necessary.

THE TEACHERS' PART

Unfortunately much of the work is done by a few teachers, or the members of the executive of the Rural Education Association, under whose auspices most fairs are held. This may be expected in initial stages of the work.

Owing to frequent changes of teachers, and hence tardiness in planning, much of the preparation is done during the last few days just preceding the fair, whereas it should represent the best of the year's work, which would necessitate a correlation of studies, the secret of successful teaching.

Without exception a very live active interest was taken in school fairs by those concerned, and already plans are being laid for improvement on last year's work.

ALBERTA

BY J. MCCAIG, M.A., EDITOR OF AGRICULTURAL PUBLICATIONS

THE school fair work made some progress in Alberta last year, although it did not reach a great magnitude. The Agricultural Representatives of the Department who have the school fair work in hand, were pressed into service in behalf of greater production, and the school fair work was not very greatly forwarded. The movement is growing rapidly, however, on its own merits. The school fairs are popular, and their good is recognized by the general public, and particularly by the children themselves, who take a great deal of natural pleasure in doing practical tasks under competition. Fairs have been operated for only three years in the province. The growth is shown by the following table:

	No. of fairs.	Schools.
1916.....	6	85
1917.....	9	157
1918,.....	15	241

Those who have been engaged in the work from the beginning report great improvement in the fairs in every particular. The exhibits are better prepared, and teachers are aiding to a greater extent in the operations of the pupils. The seriousness of the work is intensifying, both on the side of pupils and parents, and the attendance at the fairs is increasing. More live stock features are being included. Besides the calves, colts, and chickens previously included in the prize list, the work of pig clubs is made to culminate in the school fair, though the pig clubs are rather differently organized and financed. The pupils are handling their stock much better than they did before, and encouragement is given them to bring their stock forward at the Calgary and Edmonton winter and spring exhibitions, after having shown it at the school fairs earlier in the season. The programme of sports is being better arranged and elaborated than formerly.

SEPARATE FAIRS FAVOURED

At five out of the fifteen this year, the school fairs were held at the same time as regular district fairs. The weight of opinion among the managers appears to be favourable to the separate fairs. It appears to be impossible to get the school exhibits set up on the first morning and judged and open for inspection that day. The farmers have not time to make two journeys to town with exhibits, but if the school fair and general district fair both come on the second day, there is not enough leisure for adults to see the school fair properly and the carnival features of the district fair draw the the children away from the school fair. An effort was made last year to secure a good deal of the special prize money of local contributors from farmers' organizations, as the fairs are held wholly for country pupils. The Women's Institutes and United Farmers are giving help in some cases. A good many merchants give special prizes besides. The provincial Government contributed $1,200 in prizes among the fairs.

EXHIBITS AND ATTENDANCE

Details as to the volume of work and extent of interest connected with the fairs may be gathered from the following figures: there were 1,591 exhibitors, 7,737 exhibits, and 11,000 people in attendance at the fairs.

NOVA SCOTIA

LOCAL "NATURE" OBSERVATIONS

THE Department of Education of the Province of Nova Scotia, with a view to aiding teachers to interest their pupils in observing the times of the regular procession of natural phenomena each season, supplies a leaflet to the public school teachers throughout the province. This sheet provides a list of the wild flowers of the province, the cultivated garden plants, the major farming operations, the meteorological phenomena and a list of the migratory birds. Spaces are provided for the recording of the dates of the first leafing, flowering and fruiting of plants and trees; the first appearance in the locality of birds migrating north in spring or south in autumn, etc. The leaflet makes the following observations:

Teachers will find it one of the most convenient means for the stimulation of pupils in observing all natural phenomena when going *to* and *from* the school, and some pupils radiate as far as two miles from the school room. The "nature study" under these conditions would thus be undertaken at the most convenient time, without encroaching on school hours; while on the other hand it will tend to break up the monotony of school travel, fill an idle or wearisome walk with interest, and be one of the most valuable forms of educational discipline. The eyes of a whole school daily passing over the school routes will let very little escape notice, expecially if the first observer of each annually recurring phenomenon receives credit as the first observer of it for the year. The observations will be accurate, as the facts must be demonstrated by the most undoubted evidence, such as the bringing of the specimens to the school when possible.

To all observers the following most important, most essential principle of recording is emphasized: Better *no date*, NO RECORD, than a WRONG ONE or a DOUBTFUL one. Sports out of season due to very local conditions not common to at least a small field, should not be recorded except parenthetically. The date to be recorded for the purposes of compilation with those of other localities should be the *first* of the *many* of its kind following immediately after it. For instance, a butterfly emerging from its chrysalis in a sheltered cranny by a southern window in January would not be an indication of the general climate, but of the peculiarly heated nook in which the chrysalis was sheltered; nor would a flower in a semi-artificial, warm shelter, give the date required. When these sports out of season occur, they may also be recorded, but within a parenthesis to indicate the peculiarity of some of the conditions affecting their early appearance.

The teachers are required to send these sheets to the Inspector with the school returns in July and February, containing the observations made during the Spring (January to June) and the fall (July to December) respectively.

ONTARIO

JUDGING HOME GARDENS IN WENTWORTH CO.

THE Agricultural Representatives for Wentworth county in co-operation with the educational authorities carried out a satisfactory scheme for judging home garden plots throughout the county. Each board of trustees was asked to appoint one or more judges for each particular section. Twenty-eight schools appointed these judges. The Agricultural Representative supplied the judges with a book containing thirty score cards in duplicate. Instructions were sent with the books. After the judging was completed, and the cards filled in, one card was returned to the Agricultural Representative's office, and the duplicate to the teacher. Each child was given a certificate from the Department of Agriculture, showing the total score made by his garden, and also the grade which his plot was given. Plots that scored over ninety points were

given Grade A certificates; those scoring between eighty and ninety points received Grade B. certificates, and those less than eighty points Grade C. certificates.

SCHOOL DENTAL CLINIC

THE Agricultural Representative and the Women's Institute for Peel County, Ontario, in co-operation with the School Board and the Ontario Dental Society, have organized a system of dental clinics in the Streetsville school. The work was organized at a meeting held at Streetsville on November 28th, that was addressed by the leading men of the district. The teeth of the children are inspected by local dentists and cleaned free of charge. Pupils having teeth needing filling, or other professional attention, are charged a nominal fee. When the teeth are inspected a card is marked for each of those requiring further treatment that has to be signed by the parents and returned before further attention is given. The local Women's Institute makes the arrangements and takes care of the fees. Mr. Stark, the Agricultural Representative, hopes to have the system of dental clinics extended to other schools in the county.

This new activity is but further evidence of the extremely varied character of the work undertaken by the Agricultural Representatives.

MANITOBA

BOYS' CALF-FEEDING COMPETITION

AT the Manitoba Winter Fair, $1,250, besides special prizes, will be offered for the boys' calf and steer feeding competition, open to boys resident in Canada over nine years of age and under seventeen, exhibiting steers or heifers calved in 1918. The money will be divided into twenty-four prizes, ranging from $150 down to $10. Specials are offered by several breed societies. A continuation class is arranged for steers calved in 1917, and entries are limited to boys who had entries in the boys' fat calf competitions in the present and the previous four years. In this class heifers are barred and $290 in ten prizes is given for steers calved in 1917. In addition to these cash prizes, in each case the Manitoba Agricultural College offers to the winners of 1st, 2nd, and 3rd prizes one year's tuition at the College free.

The community forum is the meeting of citizens in their schoolhouse for the courteous and orderly discussion of all questions which concern their common welfare. A community may begin with questions in which local interest is manifest, such as good roads, or public health, or the method of raising and spending public funds, or methods of production and transportation of food products. A discussion of these questions will reveal at once the fact that they transcend local limits A road is built to go somewhere, and it will relate one community to another. Local health conditions can not be maintained without considering other localities, for the causes of local disease frequently lie elsewhere.

By Henry E. Jackson, Special Agent in Community Organization,
U.S. Bureau of Education.

PART IV

Special Contributions, Reports of Agricultural Organizations, Publications, and Notes.

CONFERENCE ON LIVE STOCK FUTURE

A CONFERENCE in the interest of the further development of live stock was held in Ottawa on November 19th and 20th under instruction from the Hon. T. A. Crerar, Minister of Agriculture. The conference was presided over by Dr. J. H. Grisdale, Acting Deputy Minister of Agriculture, and was addressed by the Hon. the Minister, as well as by the Dominion Live Stock Commissioner, Mr. H. S. Arkell, who took a prominent part in the discussion. The personnel of the conference consisted of the members of the Canadian Live Stock Council, the Deputy Minister of Agriculture for Quebec, representatives of the leading meat packing companies in Canada, and representatives of the Federal Department of Agriculture concerned more especially with the live stock industry.

The purpose of the conference was to consider ways and means of securing for the Canadian live stock raiser the advantages of the situation that has arisen from the devastation of the war. Mr. Henry B. Thomson, Chairman of the Food Board, advised the conference that the latest information showed the deficit in live stock in the principal countries of Europe to total upwards of one hundred and fifteen million head.

There was presented for the consideration of the meeting an agenda covering the following points:—

1. How may we secure the maximum business for Canada with the United Kingdom and Europe?
2. How may we best maintain and increase Canada's reputation on the export market in competition with other countries?
3. How may we best develop a sound commercial connection between producer and distributor?
4. How may we best increase and improve marketing facilities in every stage of the business from producer to consumer?
5. How may we best secure the organized support of capital in this enterprise?
6. How may we best obtain the steady, confident and permanent support of the country in general and farmers in particular, to this movement?
7. How may we best obtain maximum and most economical production from the range, forest, and unoccupied lands of this country?

At the conclusion of the conference the following resolutions were presented to the Cabinet with a recommendation by the representatives that each be given a favourable consideration:—

Whereas the war debt of Canada can best be paid off by developing its natural resources, particularly as having reference to the Canadian live stock industry.

And whereas in view of the existing acute shortage of animal products of all kinds in England and European countries to-day, and the certainty that these cannot be replaced for many years, this convention of live stock producers and packers meeting in conference with officials of the Department of Agriculture, resolve:

1. That a policy of rural credit sanctioned and supported by Federal Governments has proven of enormous assistance to agriculture in European countries, and also has recently been adopted by the United States, and that such loans to farmers of Canada would assist greatly in equalizing markets, improving and increasing all herds and flocks, and in the better finishing of meat animals, that the Department of Agriculture be empowered to immediately outline such a system for approval and adoption by this Government.

2. That in view of the demand for agricultural products that exist in France, Belgium, and Italy, the Government take steps to establish credits in Canada for these countries.

3. That with the view of establishing immediate commercial connection in Europe in order to secure maximum business for Canada, the Government at once appoint a representative, preferably Mr. H. B. Thomson, in the continuation of his present capacity, whose business it would be to obtain the fullest possible recognition for Canadian interests in supplying such products.

4. That the Government be requested to provide the necessary marketing facilities which will make possible the development of a permanent and extensive export trade in chilled beef and other meat and animal products, and that immediate steps be taken in connection with the Government's programme of shipping and railway transportation to provide adequate controlled temperature space in railway cars at the terminal harbor fronts and on ocean-going vessels.

5. That the Government give authority and the necessary financial support to the Department of Agriculture in launching a propaganda throughout Canada, first, for the maintenance and immediate increase of production in live stock, and, second, for a campaign of education for the improvement of the breeds of live stock.

A NATIONAL DAIRY CONFERENCE

A CONFERENCE of representatives of all the different branches of the dairy industry was held in Ottawa, November 25th to 28th, by authority of the Minister of Agriculture, for the purpose of discussing important matters affecting the industry from a national standpoint. The various Associations were asked to name delegates, and these were invited along with others whose official position entitled them to recognition. Mr. J. A. Ruddick, Dairy and Cold Storage Commissioner, who organized the Conference, presided at the different sessions.

The Delegates.

The delegates attending were as follows:—

Dairymen's Association Western Ontario:—Jas. Donaldson, Atwood, Frank Boyes, Dorchester, W. G. Medd, R.R. No. 1, Woodham.

Dairymen's Association Eastern Ontario:—J. A. Sanderson, Oxford Station, T. A. Thompson, Almonte, R. G. Leggett, Newboro.

Quebec Dairymen's Association:—J. B. Vincent, Racine, Shefford Co., L. P. Lacoursiere, St. Hyacinthe, J. P. Cox, Greenlay.

New Brunswick Dairymen's Association:—W. H. Hubbard, Norton, J. P. Simmonds, Moncton.

Nova Scotia Dairymen's Association:—D. W. Murray, Scotsburn, Harold Falconer, Stellarton.

Prince Edward Island Dairymen's Association:—J. Walter Jones, Bunbury Farm, Charlottetown, J. F. Profitt, Kensington.

Manitoba Dairymen's Association:—Walter J. Cummings, Winnipeg, Alex. MacKay, Winnipeg.

Saskatchewan Dairymen's Association:—W. A. Wilson, Saskatchewan Co-operative Creameries, Regina, O. W. Andreasen, Humboldt.

Alberta Dairymen's Association:—E. T. Love, Manager Woodland Dairy, Edmonton, P. Pallesen, Calgary Central Creamery, Calgary.

British Columbia Dairymen's Association:—S. H. Shannon, Cloverdale, T. A. F. Wiancko, Victoria.

Ontario Milk Producers' Association:—E. H. Stonehouse, Weston.

Milk Shippers' Association: (Quebec)—Jas. Winter, Ormstown.

Holstein Breeders' Association:—J. P. Griffin, Freeman.

Ayrshire Breeders' Association:—W. F. Stephen, Huntingdon.

Jersey Breeders' Association:—Bartley A. Bull, Brampton.

Ice Cream Manufacturers' Association:—J. Bingham, Ottawa Dairy, Ottawa.

Milk Distributors:—C. B. McNaught, City Dairy, Toronto.

Canadian Creamery Association:—Mack Robertson, Belleville, Ont., W. G. Jackson, Simcoe, Ont.

Milk Condensaries:—W. D. Strack, Borden Milk Co., Montreal, J. D. Laing, Brockville, Ont.

Prince Edward Island Department of Agriculture:—Fraser S. Morrow, Dairy Instructor, Charlottetown.

Nova Scotia Department of Agriculture:—W. A. MacKay, Dairy Superintendent, Truro.

New Brunswick Department of Agriculture:—H.W. Coleman, Dairy Superintendent, Sussex.

Quebec Department of Agriculture:—E. Bourbeau, General Inspector for Cheese, St. Hyacinthe.

Ontario Department of Agriculture:—G. A. Putnam, Director Dairy Branch, Toronto.

Manitoba Department of Agriculture:—L. A. Gibson, Dairy Commissioner, Winnipeg.

Saskatchewan Department of Agriculture:—Percy Reed, Dairy Commissioner, Regina.

Alberta Department of Agriculture:—C. Marker, Dairy Commissioner, Calgary.

British Columbia Department of Agriculture:—T. A. F. Wiancko, Dairy Instructor, Victoria.

Chief Dairy Instructors, Ontario and Quebec:—Frank Herns, London, Ont., G. G. Publow, Kingston, Ont.; Geo. K. Cayer, St. Hyacinthe, Que.

Dairy School Superintendents:—A. T. Charron, St. Hyacinthe, Que.; L. A. Zufelt, Kingston, Ont.; H. H. Dean, Guelph, Ont.; K. G. MacKay, Saskatoon, Sask.; R. W. Brown, Winnipeg, Man.

Montreal Produce Merchants' Association:—E. H. Hodgson, Montreal, P. W. McLagan, Montreal.

Official Butter Grader for Ontario:—J. H. Scott, Municipal Abattoir, Toronto.

Macdonald College: —Dr. F. C. Harrison, Principal.

Ontario Agricultural College:—Prof. T. H. Lund, Bacteriologist.

Quebec Agricultural Co-operative Society: —A. Trudel, 63 William St., Montreal.

Department Trade and Commerce, Ottawa:—Dr. A. McGill, Dominion Analyst.

Officials of the Department of Agriculture, Ottawa—Dr. F. T. Shutt, Dominion Chemist; Dr. F. Torrance, Veterinary Director General; J. A. Ruddick, Dairy and Cold Storage Commissioner; Geo. H. Barr, Chief, Dairy Division; J. F. Singleton, Chief Inspector, Dairy Products; Jos. Burgess, Chief Inspector, Dairy Produce Commission; J. G. Bouchard, Inspector, Dairy Products; Harvey Mitchell, Representative Dairy Branch, Maritime Provinces.

Subjects Discussed.

The discussions covered the following among other subjects:—

Legal Standards for Milk and its Products.

Commercial Grades, and the Grading of Dairy Products.

Dairy Organization—Local and National.

The Pasteurization of Cream for Buttermaking.

The Compulsory Pasteurization of Dairy By-products.

In the discussion of these subjects the Conference had the assistance of Dr. A. McGill, Dominion Analyst; Dr. F. T. Shutt, Dominion Chemist; Dr. F. Torrance, Veterinary Director-General; Mr. T. H. Lund, Bacteriologist, Ontario Agricultural College and Mr. W. D. Strack, Chemist for the Borden Milk Co.

RESOLUTIONS.

After a full discussion, and consideration in committee, the following resolutions were adopted:—

LEGAL STANDARDS. MILK AND ITS PRODUCTS.

After a general discussion the matter was referred to a special committee for consideration. This committee recommended, and the Conference approved, of the following standards:

1. *Milk*, unless otherwise specified, is the fresh, clean product, obtained by the complete, uninterrupted milking, under proper sanitary conditions, of one or more healthy cows, properly fed and kept, excluding that obtained within two weeks before and one week after calving, and contains not less than three and one-quarter (3.25) per cent of milk fat, and not less than eleven and three-quarters (11.75) per cent of total milk solids, and must contain nothing foreign to natural milk.

2. *Skim milk* is milk from which a part or all of the cream has been removed, and contains not less than eight and one-half (8.5) per cent of non-fat milk solids.

3. *Pasteurized milk* is milk that has been heated to a temperature of one hundred and forty (140) degrees Fahrenheit to one hundred and forty-five (145)degrees Fahrenheit, and held at this temperature under agitation for a period of twenty (20) to thirty (30) minutes, and immediately cooled to forty-five (45) degrees Fahrenheit or lower, and shall be at a temperature not above fifty-five (55) degrees Fahrenheit when delivered to the consumer, at which time it shall not contain more than one hundred thousand (100,000) bacteria per cubic centimetre.

4. *Sterilized milk* is non-concentrated milk that has been heated to the temperature of boiling water or higher for a length of time sufficient to kill all organisms present, and must be delivered to the consumer in a sterile condition and shall not contain less than three and one-quarter (3.25) per cent of milk fat and eleven and three-quarters (11.75) per cent of total milk solids. Sterilized milk shall not be sold or offered for sale except in hermetically closed containers bearing the words "This milk should be used within twelve (12) hours after opening the containers".

5. *Certified milk*. Milk sold as certified milk shall comply with the following requirements:

(a) It shall be taken from cows semi-annually subjected to the tuberculin test, and found without reaction.

(b) It shall contain not more than 10,000 bacteria per cubic centimetre from June to September; and not more than 5,000 bacteria per cubic centimetre from October to May, inclusive.

(c) It shall be free from blood, pus, or disease producing organisms.

(d) It shall be free from disagreeable odour or taste.

(e) It shall have undergone no pasteurization or sterilization, and be free from chemical preservatives.

(f) It shall have been cooled to 45 degrees Fahrenheit within half an hour after milking, and kept at that temperature until delivered to the consumer.

(g) It shall contain 12 to 13 per cent of milk solids of which at least 3.5 per cent is fat.

(h) It shall be from a farm whose herd is inspected monthly by a veterinarian, and whose employees are examined monthly by a physician.

6. *Evaporated milk* is milk from which a portion of the water has been evaporated, and contains not less than twenty-five and one-half (25.5) per cent of milk solids, and not less than seven and eight-tenths (7.8) per cent of milk fat.

7. *Sweetened condensed milk* is milk from which a portion of the water has been evaporated, and to which sugar has been added. It contains not less than twenty-eight (28) per cent of milk solids and not less than eight (8) per cent of milk fat.

8. *Evaporated skim milk, concentrated skim milk, condensed skim milk,* is skim milk from which a considerable portion of water has been evaporated, and contains not less than twenty(20) per cent of milk solids.

8A. *Sweetened condensed milk, sweetened concentrated skim milk, sweetened evaporated skim milk,* is skim milk from which a considerable portion of water has been evaporated, and to which sugar has been added, and contains not less than twenty-five (25) per cent of milk solids.

9. *Buttermilk* is the product that remains when butter is separated from ripened or unripened cream, by the usual churning processes; or a similar product made by the appropriate treatment of skimmed milk.

10. *Goat's milk, ewe's milk, etc.,* are the fresh, clean, lacteal secretions, free from colostrum, obtained by the complete milking of healthy animals other than cows, properly fed and kept, and conform in name to the species of animals from which they are obtained.

Cream.

1. *Cream* is that portion of milk, rich in milk fat, which rises to the surface of milk on standing, or is separated from it by centrifugal force, is fresh and clean, and contains (unless otherwise specified) not less than eighteen (18) per cent of milk fat.

2. *When guaranteed* to contain another percentage of milk fat than eighteen (18), it must conform to such guarantee.

3. *Cream* must be entirely free from gelatine, sucrate of lime, gums, or other substances added with a view to give density, consistency or apparent thickness to the article.

4. *Cream* must contain no preservatives of any kind, nor any colouring matter, other than is natural to milk.

5. *Evaporated cream, clotted cream, condensed cream,* or any other preparation purporting to be a special cream, except ice-cream, must conform to the definition of cream, and must contain at least twenty-five (25) per cent of milk fat.

6. *Homogenized cream* is a dairy product resulting from the use of a machine known as a homogenizer, and contains (unless otherwise specified) not less than eighteen (18) per cent of milk fat.

Milk Fat or Butter Fat.

1. *Milk fat, butter fat,* is the fat of milk and has a Reichert-Meissl number not less than twenty-four (24) and a specific gravity not less than $0.905 \frac{(40°C)}{(40°C)}$

Butter.

1. *Butter* is the clean, non-rancid product made by gathering in any manner the fat of fresh or ripened milk or cream into a mass, which also contains a small portion of the other milk constituents, with or without salt, and contains not less than eighty (80) per cent of milk fat, and not more than sixteen (16) per cent of water. Butter may also contain added colouring matter of harmless character.

Cheese.

1. *Cheese* is the sound, solid, and ripened product made from milk or cream by coagulating the casein thereof with rennet or pepsin, with or without the addition of ripening ferments and seasoning, and contains, in the water free substance, not less than forty-five (45) per cent of milk fat. Cheese may also contain added colouring matter of harmless character.

2. *Skim milk cheese* is the sound, solid and ripened product made from or by the use of milk commonly known as skim milk, or milk from which any cream has been removed, or milk to which skim milk has been added; or cheese containing in the water-free substance less than forty-five (45) per cent of milk fat.

3. *Goat's milk cheese, ewe's milk cheese, etc.,* are the sound ripened products made from the milks of the animals specified, by coagulating the casein thereof with rennet or pepsin, with or without the addition of ferments and seasoning.

Ice Cream.

1. Ice cream is a frozen, sweetened, dairy product, with or without harmless flavouring and colouring matter, with or without gelatine, gum tragacanth, or other harmless stiffening materials, in amount less than two (2) per cent; and contains not less than seven (7) per cent of milk fat.

Miscellaneous Milk Products.

1. *Whey* is the product remaining after the removal of fat and casein from milk in the process of cheese-making.
2. *Kumiss* is the product made by the alcoholic fermentation of mare's milk or cow's milk.
3. *Milk powder* is the soluble powder product made from milk and contains (unless otherwise specified) not less than ninety-five (95) per cent of milk solids, and not less than twenty-six (26) per cent of milk fat.
4. *Skim milk powder* is the soluble powder product made from skim milk, and contains not less than ninety-five (95) per cent of milk solids.

Recommendations.

1. Your committee recommends that the Dairy Branch of the Dominion Department of Agriculture obtain analytical data of dairy products manufactured and sold throughout Canada with a view to its use in future revision of dairy standards.
2. Your committee recommends that the Federal standards for dairy products be recognized and adopted by all Canadian municipalities which are engaged in the work of food inpsection.

COMMERCIAL GRADES AND GRADING OF DAIRY PRODUCE.

After a general discussion on the subject of commercial grades and grading of dairy produce, the matter was referred to a special committee. This committee recommended, and the Conference approved, of the following grades, standards, and definitions:

Whereas there is a lack of uniformity in the scoring of butter and cheese throughout Canada, and

Whereas the adoption of uniform score cards and certificates would benefit the dairy industry,

Be it therefore resolved that the following score cards and grade standards be adopted for general use throughout Canada, and that all score cards of this form bear the heading, Canadian Score Card for Butter, or Cheese, respectively:

Scale of Points for Scoring Cheese.

(1) Flavour— 45	(2) Texture— 25	(3) Closeness 15
Acidy	Stiff	Loose
Fruity	Corky	Ragged holes
Rancid	Mealy	
Tainted	Coarse	Gas or pin holes
Cowy	Weak	
Weedy	Lumpy	Swiss holes
Bitter	Pasty	
Gassy		
Heated		
(4) Colour— 10	(5) Finish— 5	
Streaky	Rough edges	
Wavy	Crooked ends	
Mottled	Soft rinds	
Acid cut	Mouldy	
High	Dirty	
Light	Box	

Total 100 points.

Grades for Cheese.

Special Grade—Score 94 to 100 points. Minimum for flavour 41 points.
First Grade—Score 92 and under 94 points. Minimum for flavour 39 points.
Second Grade—Score 87 and under 92 points. Minimum for flavour 37 points.
Off Grades—Score under 87 points and under 37 points for flavour.

Standards for Grading Cheese.

Special Grade

Flavour—Clean, sound and pure.
Texture—Close, firm and silky.
Colour—Good and uniform.
Finish—Even in size, smoothly finished, sound and clean surfaces, straight and square.
Boxes—Strong, clean, well made and close fitting. If made of wood the ends to be of seasoned timber. Weights stencilled or marked with rubber stamp.

First Grade

Flavour—Not quite clean.
Texture—Slightly weak or open.
Colour—Uniform.
Finish—Fairly even in size, well finished, sound surfaces.

Boxes—Strong, clean, well made and close fitting. If made of wood the ends to be of seasoned timber. Weights stencilled or marked with rubber stamp.

Second Grade

Flavour—"Fruity," not clean, "turnipy," or other objectionable flavour.
Texture—Weak, open, loose, "acidy," too soft, too dry.
Colour—Uneven, mottled, or objectionable shade.

Finish—Very uneven in size, showing rough corners, Black mould, dirty or cracked surfaces, soft rinds.
Boxes—Too large in diameter; top edge of box more than ½ an inch below the top of the cheese. Made of light material. Ends made of improperly seasoned material.

Off Grades

Flavour—Rancid, badly "off," anything inferior to second grade.
Texture—Very weak, very open, showing pin holes, or porus, very "acidy," very soft or very dry.
Colour—Badly mottled, or very objectionable shade.
Finish—Anything worse than second grade.
Boxes—No question of boxes sufficient to make off grade if other qualities are good.

Scale of Points for Scoring Butter.

(1) Flavour—45	(2) Texture—15	(3) Incorporation of moisture—10
Flat	Weak	Leaky
Heated	Salvy	Free moisture
Weedy	Greasy	Milky brine
Sour	Brittle	
Stale	Over-worked	
Metallic		

(4) Colour—10	(5) Salting—10	(6) Packing 10
Too light	Too light	Poorly packed
Too high	Too heavy	Poorly printed
Uneven	Undissolved	Poorly wrapped
		Poorly nailed
		Poorly finished
		Dirty

Total 100 Points.

Grades for Butter.

Special Grade—Score 94 to 100 points. Minimum for flavour 41 points.
First Grade—Score 92 and under 94 points. Minimum for flavour 39 points.
Second Grade—Score 87 and under 92 points. Minimum for flavour 37 points.
Off Grade—Score under 87 points and under 37 points for flavour.

The Committee recommends that official grade certificates shall be issued only on butter made from effectively pasteurized cream.

Standards for Grading Butter.

In order that creamery butter may qualify for "Special" grade certificates, it must have been made from pasteurized cream, and otherwise closely conform to the following description, which represents in a general way the requirements of the export, or best Canadian, markets.

Flavour—Fine, sweet, mild and clean.
Texture—Firm and fine.
Incorporation of moisture—Clear, but not excessive free moisture.
Colour—Uniform and of a pale straw shade.
Salting—Not more than 3 per cent and thoroughly incorporated.

Grade Standards and Grade Descriptions of Cream

Table Cream

This grade shall include any lot of sweet, clean, flavoured cream bought for re-sale for household use. The acidity of this cream shall not be more than 18% at the time of grading. The term "Table Cream" may be supplemented by the terms "Inspected" or "Extra Special" as the initial purchaser may in each case uniformly adopt.

Cream for Buttermaking.

Special Grade

This grade shall include any lots of cream which is fresh and clean in flavour, of a uniform consistency, and fit for making into special grade butter. The acidity of cream in this grade shall be not more than .3% (three-tenths of one per cent) at the time of being graded at the creamery where it is to be manufactured into butter.

First Grade

This grade shall include any lot of cream which is reasonably fresh and clean in flavour, of a uniform consistency and fit for making into butter of this grade without the addition of acid neutralizing agents. Its acidity shall not be more than .5% (five-tenths of one per cent) at the time of grading at the creamery where it is to be manufactured into butter.

Second Grade

This grade shall include any lot of cream that does not meet with the requirements specified for the next higher grade; which is bitter, stale, musty, metallic, or otherwise unclean in flavour.

NATIONAL DAIRY COUNCIL.

Whereas the present prosperity of agricultural communities has been largely brought about by the growth of the creamery and cheese making industries;

Be it resolved that in order to safeguard the dairy industry, steps be at once taken to organize a National Dairy Council, and that all dairy organizations represented at this meeting be included in the organization, and also any other dairy organizations that may be formed and are eligible to send representatives to a National Dairy Council.

The special committee to which this resolution was referred brought in the following report.

Your committee beg to recommend that the National Dairy Council be composed of two representatives from each Province, one representative from each Province to be a producer of milk, and that they add to their numbers as follows:

Four representatives of the cheese industry, three from the East and one from the West.

Three representatives of the butter industry, two from the East and one from the West.

Three representatives of the milk distributors, two from the East and one from the West.

Three representatives of the milk and cream producers for city trade, two from the East and one from the West.

Two representatives of the ice cream manufacturers, one from the East and one from the West.

One representative of the condensaries.

And that these thirty-four representatives elect from among themselves a President and a Vice-President, one of whom shall be from the East and the other from the West, and four members of the Executive from Eastern Canada and three members of the Executive from Western Canada.

The Eastern Executive will deal with matters which are of interest to the Eastern district only, and the Western Executive will deal with matters which concern only the Western district. When matters of mutual interest are to be considered both the Eastern and the Western Executives will meet at the same time and communicate by Wire.

PASTEURIZATION OF CREAM FOR BUTTERMAKING.

Whereas bacteria under modern conditions of creamery butter making play so very important a part in determining the flavour of the butter, which is regarded as forming about one-half of its value; and

Whereas pasteurization has been found to be the most practicable means of controlling bacteria and enzymes in milk and cream, thereby improving the flavour and keeping quality of butter; and

Whereas the expense of such pasteurization is not such as to prevent its immediate and general adoption by creamery butter manufacturers;

Resolved that this Dominion Dairy Conference hereby recommends the system known as pasteurization of milk or cream in the manufacture of all butter made in Canada, and urges its adoption at once by all creameries which are not already using this method. The standard temperature recommended is 170 degrees Fahrenheit, holding for 10 minutes.

COMPULSORY PASTEURIZATION OF DAIRY BY-PRODUCTS.

Whereas Tuberculosis of swine is shown by statistics to be increasing from year to year and is now causing serious losses to Canadian farmers; and

Whereas this disease in swine is derived almost entirely from tuberculous cattle, chiefly by feeding the hogs on unpasteurized dairy products;

Be it resolved that the by-products of cheese factories and creameries should be rendered harmless by pasteurization or sterilization before removal from such factories for feeding purposes, and that the Dominion Government be requested to make it compulsory to pasteurize or sterilize all dairy by-products.

DAIRY SIRES.

Whereas the greatest need of the dairy industry in Canada at the present time is the economic production of milk, and as the greatest factor in the economic production of milk is the cow that can produce large quantities of milk and fat, it naturally follows that the greatest problem confronting the dairymen of Canada to-day is how to eliminate the unprofitable or low producing cow from the dairy herds.

It is generally admitted that the sire is the most important factor in building up a dairy herd, and also that better results can be obtained by using a properly pure-bred sire than by using a grade. Two regrettable features about using pure-bred sires are that in many cases it is impossible for purchasers to get any reliable information regarding the milk producing qualities of the dams of the animals offered for sale; and that too many dairymen apparently do not realize the importance or the value of knowing something about the milk producing qualities of the sire's ancestors.

Be it therefore resolved that this Dominion Dairy Conference regrets the fact that many

breeders of pure-bred dairy stock do not keep records of the milk and fat produced by each cow, and are, therefore, unable or unwilling to provide purchasers of pure-bred dairy cattle with this most valuable information, with the result that farmers often purchase pure-bred dairy sires, expecting to improve the milk producing qualities of their herds, but fail to get results because the animals are bred from low milk producing stock.

We, therefore, recommend that a special effort be made by the Dairy Schools, Dairy Instructors, Dairymen's Conventions and other suitable avenues, to place before the milk producers of Canada the importance of buying pure-bred dairy sires from only the breeders who can show reliable records of the milk and fat produced by the dams of the animals offered for sale.

TAKING MILK SAMPLES.

Be it resolved that in future the sample of milk or cream to be tested be divided into three equal portions, each properly sealed, one to be handed to the vendor, one to be tested by the municipality, and the third to be held for testing by an independent authority should occasion require it.

NOTE.—This resolution refers only to milk sold in towns or cities for direct consumption.

MARKET INVESTIGATIONS.

Whereas the creamery industry in Canada has developed to such an extent that there will be a larger surplus of butter available for export in the immediate future, and in order that a product may be exported which will meet with favour in foreign markets and there command the highest market prices, therefore;

Be it resolved that this Conference of Dominion dairymen ask the Dominion Government to appoint a Commission composed of butter experts to investigate the requirements of various export markets and report their findings and recommendations at the earliest possible date.

PAYING FOR MILK BY TEST.

Whereas the payment of milk on the pooling system is an injustice to producers selling milk containing a high percentage of butter fat,

Therefore this Conference places itself on record as favourable to the producer being paid for milk for all purposes of manufacture and for human consumption on the basis of its butter fat content, and further

That the various Provincial Governments be requested to enact such legislation at an early date as will bring such payment of milk into effect.

RELEASING SOLDIERS.

Whereas the war debt of Canada can best be paid off by developing its natural resources, particularly as having reference to the Dairy Industry, and

Whereas in view of the great and increasing demand for dairy products, and

Whereas the Dairy Industry is badly crippled for want of suitable labour, therefore;

Be it resolved that this Conference memorialize the Government, now that Peace is practically declared, to release at the earliest moment possible all soldiers in any way connected with the dairy industry, which includes producers, cheese and butter makers, milk distributors, and others, that they may return to their respective occupations and so be ready when next season opens for a big output of milk and dairy products.

OLEOMARGARINE.

Whereas the federal authorities saw fit to temporarily admit the manufacture and sale in the Dominion of Canada of oleomargarine; and

Whereas the order permitting said manufacture and sale was granted only to relieve food conditions during the present war; and

Whereas an armistice for the consideration of Peace terms is now in force; and

Whereas on the successful conclusion of the war conditions in the Dominion will again become more normal;

Be it therefore resolved that the said order be rescinded, and that the manufacture and sale of oleomargarine within the Dominion of Canada again be declared illegal, and also that no further action will be taken without consulting the National Dairy Council.

THE ONTARIO WINTER FAIR DAIRY TEST

At the annual three-day dairy test carried on at the Ontario Winter Fair at Guelph in December, a pure-bred Holstein cow won the championship award and an Ayrshire 2nd place. The entries included 26 Holsteins, 21 Ayrshires, 13 Jerseys, 4 Shorthorns and 4 grades. The awards were made on the following scale: Twenty-five points for each pound of fat, 3 points for each pound of solids (not fat), 1 point for each ten days in milk after the first thirty days; limit 10 points. The following table shows the ownership and record of the first prize cows in each class, by ages, as compared with the records made at this show in 1917:

Age, Months	Name	Owner	Results in 1918			Results in 1917		
			Lb. Milk	Per Cent Fat	Total Points	Lb. Milk	Per Cent Fat	Total Points
		HOLSTEINS						
48 and over	Fayne Segis Pontiac	Geo. Smith, Port Perry	266·7	3·6	317·635	218·1	3·5	253·814
36 and under 48	Ruby Fayne De Kol	M. L. Hayley, Springford	219·1	3·9	271·138	195·7	3·55	228·041
24 and under 36	Elmwood Daisy Fayne	J. W. Kelly, Hagersville	162·5	3·6	191·586	172·7	3·6	205·127
		AYRSHIRES						
48 and over	Pearl of Balquido	Harmon Macpherson, Copetown	201·8	4·65	290·588	250·6	3·45	282·725
36 and under 48	Rose of Montrose	H. C. Hamill, Markham	144·6	4·7	208·618	147·1	4·55	210·077
24 and under 36	Free Trader's Sarah	Jno. McKee & Son, Norwich	128·3	4·6	184·405	130·2	4·25	175·122
		JERSEYS						
48 and over	Fanny of Edgeley	Alfred Bagg, Edgeley	160·0	5·1	252·42	158·4	4·8	239·261
36 and under 48	Edgeley Daisy Queen	Jas. Bagg & Sons	124·4	5·1	169·924	115·9	5·5	197·622
24 and under 36	Edgeley Sweet Briar	Jas. Bagg & Sons	103·0	5·2	164·751	108·0	4·7	162·057
		SHORTHORNS						
48 and over	Stanley's Pride	S. W. Jackson, Woodstock	120·0	4·1	161·27	177·9	3·5	206·992
36 and under 48	Butterfly Bellona	S. W. Jackson	116·6	4·3	158·781	87·5	3·8	108·587
		GRADES						
48 and over	Tilly	Geo. Smith, Port Perry	215·7	3·2	231·437	219·1	4·3	304·425
24 and under 36	Spot	Geo. Smith	164·5	2·9	164·898	.....	.....	.....

VACANT LOT GARDENING EXPERIENCES

FORT WILLIAM AND THUNDER BAY

BY CHARLES BIRKETT, SECRETARY THUNDER BAY PRODUCTION AND CONSERVATION ASSOCIATION

There has been nothing of a co-operative nature in vacant-lot gardening done in this district outside of the executive work of the Vacant Lot Garden Association of Fort William and the Garden Club of Port Arthur and the Thunder Bay Production and Conservation Association.

In 1915 the first efforts towards increased production were commenced, largely as a measure of relief by committees appointed by the cities, that in Fort William being known as the Vacant Lot Garden Association. The organized distribution of vacant lots—loaned for the purpose by owners—was taken the fullest advantage of by enthusiastic gardeners as well as by those in need of relief. The results were so gratifying as to warrant the taking over of the Vacant Lot Garden Association by a committee of enthusiastic citizens. The same thing occurred in Port Arthur, resulting in the formation of their Garden Club.

ENCOURAGED BY EARLIER EFFORTS

As a result, the call for increased production in 1917, and 1918 particularly, found a ready response in both of these cities in individual effort. Many enthusiastic gardeners, whose efforts had hitherto been the subject of the admiration of friends and neighbours alike, now found themselves the centre of a group of inquiries. Nothing could have been more encouraging. The experience of enthusiasts in this climate was at the disposal of the inquirers.

In turn the immense satisfaction of the enthusiast in the realization that his experience could benefit his country became an added stimulus to greater effort. As a consequence the past season saw experiences which five years ago would have raised a smile at the mere mention of them. One man has seed from beans, peas, kale, radish, turnip, carrot, parsnip, and tomato, and but for severe frost would have had parsley, lettuce and beet besides. These were raised in addition to an abundance of other vegetables for canning and storing, so are the result of further, not diverted, effort.

RESULT OF ORGANIZATION

It will be realized from the foregoing that co-operation has been superseded by community enterprise—the only difference being expressed by the word organization. The purchase of seed and fertilizers is governed

by individual requirements, taste, and conditions, as is also the planting and cultivation of the crop. Whilst the climate is a deterrent to gardening, it is also responsible for the almost complete absence of the Colorado beetle and many diseases, so that spraying is rarely necessary. Most garden produce is used at home or supplied to neighbours unable to raise their own. The short season does not allow of much being accomplished in the growing of seed, except by enthusiasts with hotbed or cold frame equipment. A few home gardens grow their own parnsip seed, however.

WORKERS AND ACRES

I might add that the total number of backyard gardens in Fort William is 1,960, covering 127½ acres. The total number of vacant lot gardeners is 1,016, cultivating 194 acres. The total membership of the Fort William Vacant Lot Garden Association is 649. The population of the city is 19,000.

At Port Arthur the total number of backyard gardens is 1,495, covering 78 acres. The total number of vacant lot gardeners is 520, cultivating 116 acres. The total membership of the Garden Club is 981. The population of the city is 16,000.

GALT, ONT.

BY ROBT. S. WILSON, SECRETARY, GALT VACANT LOT ASSOCIATION

Beyond engaging a reliable man to do the ploughing, harrowing and discing, if needed, we indulged very little in what may be termed co-operation. We found that the lot-holders preferred to deal directly with the three seed merchants of the city. In other respects we did all we could to encourage each lot-holder to cultivate his own plot. This appeared to us to create greater interest. Quite a lot of spraying was needed, especially as regards the potatoes, but again each lot-holder did his own work, or engaged somebody to do it for him. The results were generally satisfactory and the lot-holders either used their own produce or sold it to the corner grocer or, perhaps, directly to neighbours. A number have grown seeds for the coming year with good success. As a whole we have had a very successful year. Over 600 vacant lots were planted. We are satisfied that the ultimate result will be greater interest among our citizens in gardening. They have come to realize that both health and pleasure can be obtained from cultivating the soil. I would estimate the value of the produce resulting this year as exceeding $9,000.

GIANT SUNFLOWERS IN VACANT LOT GARDEN.

NIAGARA FALLS, ONT.

BY H. J. MOORE, QUEEN VICTORIA PARK

In order to stimulate enthusiasm in the production of vegetables, the Niagara Falls Horticultural Society gave as options to one hundred and thirty of its members twenty-two packets of vegetable seeds to each member, making a total of twenty-eight

hundred and sixty actually distributed. The officers of the society personally weighed out the seeds from bulk. The members called for the seeds at a central distributing point, and saved the expenses of delivery.

One ton of fertilizer was purchased by the Horticultural Society and sold at cost to members and other individuals, which was three and one half cents per pound. A maximum of twenty-five pounds was allowed to each individual. The St. Andrew's Club, The Girl Guides, The Community Gardens, Soldiers of the Welland Canal Force, all of which had organizations as well as the Horticultural Society, took advantage of the distribution of the fertilizer.

PLANTING AND CULTIVATION

The ground was ploughed and harrowed by teams supplied by the City Council, and prepared to receive the crops. The planting and cultivation was done by members of the organizations, each organization worked its own plot, except in the case of the back-yard gardens, which were cultivated by individuals.

SPRAYING AND IRRIGATION

The organizations sprayed their plots where necessary. Except in the case of potatoes, spraying was not essential. Irrigation was not so necessary at Niagara Falls during the year 1918 as at many less fortunate points. The spray from the Falls and the humidifying influence of the river were helpful factors in the production of vegetables. Only during a very short period was hose irrigation practiced. In case of a severe drought, the City Council was prepared to supply water to the outlying plots by means of the street sprinkling wagons. Individual plots within the city water limit were, when necessary, watered by means of the hose. Had spraying been necessary to eradicate disease, the Council likewise would have placed a power sprayer at the disposal of the organizations.

GROWING SEED

Individual saving of seed was advocated, as by this means the grower saw that varieties which had produced freely were allowed to seed. Each interested person carefully watched the seeds on the plot arrive at maturity, and carefully collected and stored them away in his or her home. Thus no mixing of varieties occurred and the grower was assured of good seed likely to produce uniform crops.

VACANT LOT GARDENING—SOME SAMPLES AT PETERBOROUGH, ONT.

AREA UNDER CULTIVATION

During the year 1917 the total area under cultivation in the City of Niagara Falls was approximately forty acres. Unfortunately

no actual record was kept of the yield. It was, however, estimated that about nine thousand dollars worth of vegetables were produced. During 1918 with a fairly effective organization under the leadership of the Horticultural Society ninety acres were cultivated. This acreage was composed as follows: Fifteen hundred plots, varying in size from one square rod to one eighth of an acre, but chiefly of a small size, in all about thirty-eight acres cultivated by vacant lot and back-yard gardens; forty acres in larger plots by persons who owned horses or who had facilities for cultivating. Seven acres were devoted to a community garden; three acres of this was later taken over by the St. Andrew's Club of the Presbyterian Church. A plot of five acres was cultivated by Soldiers of the Welland Canal Protective Force, and one acre, the property of the City Hospital, by the Niagara Falls Girl Guides.

From the forementioned acreage, according to fairly accurate figures based upon forms filled out by growers, an average of three hundred dollars worth of vegetables per acre were produced, valued in the aggregate at $27,000. The population of the City of Niagara Falls is approximately thirteen thousand.

PETERBOROUGH, ONT.

BY F. H. DOBBIN, ALDERMAN

Peterborough enrolled under the banner of Greater Production, last year, many additional recruits. The well-deserved and widely read and circulated. The results were at once seen in improved routine and blight. Early spraying was not the rule.

VACANT LOT GARDENING—THE REWARD, PETERBOROUGH, ONT.

earned results of the season of 1917 inspired many others to effort. In all, over 830 plots were selected and cultivated.

As might be expected the results varied with the soil, experience, and efforts of the people cultivating. Early in the year advantage was taken of the offer of the Department to send forward copies of leaflets and publications containing useful information. These leaflets were placed for circulation at convenient stores throughout the city, and were

This defect will be corrected next season.

Roots have been a marvellous success. The moist weather favoured large growth. methods adopted, directly owing to the well-selected information at hand.

In general the crops have been ample. Potatoes in many cases suffered from the Beets, carrots, turnips, etc., grew beyond all records. Tomatoes from the same cause, were comparatively a failure, except in gardens with a favourable southern exposure.

Cabbage seems to have generally escaped the ravages of the pests that pay attention to cabbage and the cauliflower, for the samples of heads raised and shown were certainly very fine. Onions, beans, beets, etc., were favoured.

Last season the back of the potato price-lifter was broken; broken by the efforts of the men and women who took hoes and cultivated, determined that never again would they pay $5.50 per bag of potatoes. This season the local demand has been about met, up to, say, the opening months of next spring.

On the whole we have good reason to be contented. While individual cases may have failed to reach high water mark, the larger number have gained substantial results, and have the serene conviction that by self-work the cost of living has been to some extent met.

TORONTO, ONT.

BY GEO. BALDWIN, F.R.H.S., SECRETARY AND SUPERINTENDENT, VACANT-LOT GARDENING ASSOCIATION

For our vacant-lot holders we purchased 14 varieties of vegetable seeds, viz; parsnips, carrots long, carrots short, beets round, beets long, cucumbers, radish, lettuce, swede turnips, squash, beans, corn, onions and nasturtiums, wholesale, and supplied them at cost. In other words, the seeds we supplied at $2.00 per parcel would have cost the lot holder $4.11 retail. In the west end of the city we are able to supply free one load of manure to each lot, owing to the kindness of the Union Stock Yards Company donating all the manure we require, gratis, we, of course, arranging for the hauling of the same. In the east end of the city we are unable to procure any manure, consequently the lot-holders are left to their own resources, as it would cost too much to haul from the west to the east. Up till now we have done the ploughing and harrowing free, and everything absolutely free, to returned soldiers or their dependents, including seeds, our association being kept up by voluntary contributions.

The planting and cultivating are done by the lot-holders. We have supplied 8 sprayers for the whole city; the sprayer being left at a specified place and each district gets it in turn, returning it to the same place again when through. We had 4 garden hydrants installed at different points. Our lot-holders have permission to connect their hose to the nearest house. Our lots are of a size, viz; about 4,000 square feet each. The lot-holders grow just about enough for a family of five, and, with few exceptions, nothing is sold, arrangements for which they make themselves. We had under cultivation in 1918 2,060 gardens, all of which did well, and we estimate the value of our crops at between $75,000 and $80,000.

REGINA, SASK.

BY JAMES F. BRYANT, M.A., LL. B., PRESIDENT, REGINA FOOD PRODUCTION ASSOCIATION

We have had a very successful year in connection with the Regina Food Production Association. More gardens were planted this year than ever before and the returns were much better. When the Garden Contest was on for the examination of different gardens in the city for the silver cups donated, we had over one hundred and fifty entries in the different classes. This does not mean that these were all the gardens. It means 150 persons thought they had the best gardens.

We did not purchase any seed or fertilizer in co-operation this year, nor did we adopt the method of co-operation in connection with either the planting and cultivating, marketing, or growing of seed for next year. There was no occasion for spraying or irrigation in this district.

On payment of the sum of $2.00 a person became a member of the Association, was entitled to a twenty-five foot lot.This was ploughed, disced, and put in shape for planting by the Association. A person could get two twenty-five foot lots, or, if desirable, could get a large acreage in the suburbs for potatoes. The only co-operation in planting was ten acres of potatoes put in by the Rotary Club. They bought their seed in bulk, had an automobile procession, and all assisted in the planting. After the first planting each man looked after his own portion of the field.

VICTORIA, B.C.

BY W. J. SARGENT, CHAIRMAN, VICTORIA CITY INCREASED PRODUCTION COMMITTEE

Vacant-lot gardening in the city of Victoria has not been carried on by a club, but as a feature of Civic Government. The work was in charge of a committee of the City Council known as The Increased Production Committee.

The Increased Production Committee purchased from reliable sources, and distributed at cost to cultivators of city lots, or home gardens, all the seed they had applications for.

The ploughing, discing, and harrowing of the lots of all cultivators was done by the Committee at cost.

Having about fifty horses, the city has quite a quantity of stable manure, and, during the summer months, this is sold by contract to some farmer outside the city, who removes it daily from the stables, together with the street sweepings. During the balance of the year, this manure is delivered to any person within the city who will make use of it in fertilizing his garden at a rate of 75 cents per single horse cartload, and every pound of this fertilizer has been readily purchased since the war began. In addition to the stable manure and street sweepings, the Committee distributed, at cost, all the whale guano the cultivators of city lots would purchase, amounting to 12,000 pounds.

There are no potato bugs in British Columbia, and, consequently, there is no need for spraying here against this pest, and for diseases. There has been no co-operative action respecting spraying or treating seed potatoes, but it is likely some action will be taken along this line next season.

The city operates a public market, and all surplus garden produce is conveniently disposed of through this medium.

The growing of garden seeds is being carried on by quite a number of persons in and around Victoria, and, from the contracts already entered into with large seed houses in the interior and eastern Canada, the growing of high class garden seeds bids fair to become one of the important industries of Vancouver Island.

The Committee gave a series of cash prizes for best kept city gardens. This stimulated care in cultivation, which conduced toward better yields with good results.

POTATO GROWING AND GARDENING CONTESTS

The results of the Boys' Potato Growing Contests in Russell and Carleton Counties, and the Girls' Gardening and Canning Competition in Carleton County in 1918, instituted and supported by the late R. B. Whyte, were announced at a public meeting held in the Ottawa City Hall on December 7.

These competitions were confined to boys between the ages of 12 and 18 years. In the Potato Growing Contest, each competitor was required to operate one-tenth of an acre of crop, and to keep an accurate account of his operations and expenditures. In the Carleton County contest, eleven boys entered and seven completed the work. In Russell County, six out of nine applicants complied with all the requirements of the competition.

In each case six prizes were awarded. In Carleton County, the average yield of the prize winners was 219·6 bushels per acre, and in Russel, County, 228·8 bushels. The average for the two counties was 210·9 bushels to the acre. The average cost of producing one bushel was 27·3 cents, as compared with 31·87 cents the previous year. The average net profit per acre of the prize winners in the two counties in 1918 was $64·01, as compared with $101·82 per acre in 1917. All but one of the competitors, who used the Irish Cobbler variety, confined their crop to the Green Mountain potato. Six of the competitors at harvest time selected specially desirable hills for planting a special seed plot next year.

THE GARDENING AND CANNING COMPETITION

The Gardening and Canning Competition commenced in 1915 was confined to girls from 10 to 18 years of age, inclusive. Each was required to operate a garden of approximately one-twentieth of an acre and to grow, at least, raspberries, carrots, onions, beets, tomatoes, peas, and beans, and to can and exhibit as many as possible of the crops grown. In this contest 28 girls participated, 21 operated gardens, 12 submitted essays on their work, and 8 carried out the work in all its details.

Most of the competitors grew a large range of crops, the first prize winner growing no less than twenty-seven classes of vegetables and fruits, including forty-two varieties in all.

A factor of this competition was the presentation by the late Mr. Whyte of forty plants of the Herbert raspberry, a variety originated by himself. Each competitor was expected to contribute to friends and neighbours young plants from these from year to year. The reports of the competitors indicated a wide distribution among the farmers of the county from this source.

THE WILD ROSE AS A NATIONAL EMBLEM

BY EDITH PAGET, MANUEL, EDMONTON, ALBERTA

Observing that a national flower is urged for soldiers' graves, I would suggest our wild rose, so plentiful both in Ontario and the western provinces. The brave men who fought our battle "over there" all loved the wild rose, I am sure. "Rose" for England; why not "Wild Rose" for Canada? I know it is the flower my boy, who is continuing the fight, shall place on his eldest brother's grave, who fell in the war.

ASSOCIATION AND SOCIETIES

EVENTS OF THE COMING MONTHS

Jan. 6–7–8—Manitoba Cattle Breeders, Horse Breeders, Sheep Breeders, Swine Breeders', Associotion at Brandon, Secretary, W. I. Smale, Brandon.

Jan. 7-10—Northern Ontario Poultry Association, Fort William; Secretary, B. Freestone, Fort William.

Jan. 8- —Meetings of Quebec Farmers' Clubs; Oscar Lessard, Secretary of the Council of Agriculture, Quebec.

Jan. 8-10—Manitoba Grain Grower's Convention at Brandon; Secretary, W. R. Wood, M.L.A., Winnipeg.

Jan. 8-10—Manitoba Live Stock Conference at Brandon; Secretary, W. I. Smale, Brandon.

Jan. 8-11—Provincial Poultry Show in Vancouver, B.C.; Secretary, W. C. Jenkins, Vancouver, B.C.

Jan. 9- —British Columbia Poultry Association, Vancouver, Secretary, J. R. Terry, Victoria.

Jan. 9-10—Eastern Ontario Dairymen's Association Annual Convention. Belleville; Secretary, T. A. Thompson, Almonte.

Jan. 14–15—Experimental Union, O, A. C., Guelph, Secretary, C. A. Zavitz, Guelph.

Jan. 14-17—Convention of Agricultural Societies, Poultry Show and Provincial Seed Fair, Saskatoon, Sask.; Secretary-Manager, C. D. Fisher, Saskatoon.

Jan. 14-17—Ottawa Winter Fair; Secretary, W. D. Jackson, Agricultural Representative, Carp.

Jan. 15- —Quebec Agricultural Societies meeting; Oscar Lessard, Secretary of the Council of Agriculture, Quebec.

Jan. 15-16—Western Ontario Dairy Association Annual Convention at London; Secretary, Frank Hearns, London.
British Columbia Dairymen's Association at Kelowa, Secretary, T. A. F. Weiancks, Victoria.
Prince Edward Egg and Poultry Association, Charlottetown, Secretary, Wm. Kerr, Charlottetown.

Jan. 21-22-23—Nova Scotia Fruit Growers' Association, at Bridgetown, Secretary, Manning Ells, Port Williams.

Jan. 21-24—United Farmers of Alberta annual convention in Edmonton; Secretary, H. Higginbotham, Calgary.

Jan. 22- —Ontario Vegetable Growers' Association Convention, Toronto, Secretary, J. Lockie Wilson, Toronto.

Jan. 23- —Ontario Plowman's Association, Toronto, Secretary, J. Lockie Wilson, Toronto.

Feb. 3- —Canadian Thoroughbred Horse Society annual meeting, Toronto; Secretary, T. J. McCabe, M.A., Toronto, Ont.
Canadian Swine Breeders' Association annual meeting, Toronto; Secretary, R. W. Wade, Toronto.
Canadian Pony Society annual meeting, Toronto; Secretary, G. deW. Green, Toronto.

Feb. 4- —Ontario Swine Breeders' Association annual meeting, Toronto; Secretary, R. W. Wade, Toronto.
Dominion Shorthorn Breeders' Association annual meeting, Toronto; Secretary, Professor G. E. Day, Guelph.
Ontario Berkshire Society annual meeting, Toronto; Secretary, R. W. Wade, Toronto.
Ontario Yorkshire Club annual meeting, Toronto; Secretary, R. W. Wade, Toronto.
Canadian Trotting Association annual meeting, Toronto; Secretary, W. A. McCullough, Toronto.
Canadian Sheep Breeders' Association annual meeting, Toronto; Secretary, R. W. Wade, Toronto.
Canadian Standard Bred Horse Society annual meeting, Toronto; Secretary, John W. Brant, Ottawa.
French Canadian Cattle Breeders' Association annual meeting, Montreal; Secretary, J. A. Couture, Quebec.
French Canadian Horse Breeders' Association annual meeting, Montreal; Secretary, J. A. Couture, Quebec.
Quebec Sheep Breeders' Association annual meeting, Montreal; Secretary, J. A. Couture, Quebec.
Quebec Swine Breeders' Association annual meeting, Montreal; Secretary, J. A. Couture, Quebec.

Feb. 5- —Ontario Sheep Breeders' Association annual meeting, Toronto; Secretary, R. W. Wade, Toronto.
Canadian Jersey Cattle Club annual meeting, Toronto; Secretary, B. A. Bull, Brampton.
Canadian Hackney Horse Society annual meeting, Toronto; Secretary, H. M. Robinson, Toronto.
Canadian Kennel Club annual meeting, Toronto; Secretary, J. E. Dowling, Toronto.

Dominion Cattle Breeders' annual meeting, Toronto; Secretary, R. W. Wade, Toronto.
Quebec General Live Stock Associations' annual meeting, Montreal; Secretary, J. A. Couture, Quebec.

Feb. 5- 7—Ontario Horticultual Association annual meeting, Toronto; Secretary, J. Lockie Wilson, Parliament Buildings, Toronto.

Feb. 6- —Canadian Shire Horse Association annual meeting, Toronto; Secretary, G. deW. Green, Toronto.
Clydesdale Horse Association of Canada annual meeting, Toronto; Secretary, J. W. Wheaton, Toronto.
Canadian Hereford Association annual meeting, Toronto; Secretary, H. D. Smith, Ancaster, Ont.
Ontario Horse Breeders' annual meeting, Toronto; Secretary, R. W. Wade, Toronto.

Feb. 7- —Eastern Canada Live Stock Union annual meeting, Toronto; Secretray, R. W. Wade, Toronto.

Feb. 11-15—Ontario Corn Growers' Association annual meeting and Corn and Grain Exhibition; Secretary, P. L. Fancher, Chatham.

Feb. 12- —Canadian Ayrshire Breeders' Association annual meeeting, Montreal; Secretary, W. F. Stephen, Huntingdon, Que.

Feb. 13–14—Fairs and Exhibitions Association, Toronto, Secretary, J. Lockie Wilson, Toronto.

Feb. 17-21—Provincial Dairy Show, Winnipeg, Man.; Secretary, L. A. Gibson, Dairy Commissioner, Winnipeg.

Feb. 18- —Pure Maple Sugar and Syrup Co-operative Agricultural Associations annual meeting, Joliette, Quebec; Secretary, Joseph H. Lefebvre, Waterloo, Que.

Feb. 18- —Manitoba Canadian Seed Growers' Association. Annual Meeting at Winnipeg. Secretary, W. F. G. Weiner, Winnipeg.

Feb. 18–21—Agricultural Societies. Annual Meeting at Winnipeg. Secretary, S. T. Newton, Winnipeg.
Home Economics Societies, Annual Meeting at Winnipeg. Secretary, S. T. Newton, Winnipeg.

Feb. 19- —Manitoba Bee Keepers' Association. Annual Meeting at Winnipeg. Secretary R. M. Muckle, Winnipeg.

Feb. 19–20—Manitoba Dairy Association. Annual Meeting at Winnipeg. Secretary, L. A. Gibson, Winnipeg.

Feb. 20–21—Horticultural and Forestry Association. Annual Meeting at Winnipeg. Secretary, F. W. Brodrick, Winnipeg.

THE POTATO ASSOCIATION OF AMERICA

The fifth annual meeting of the Potato Association of America (an international organization) was held at Milwaukee, Wis., on November 20th and 21st, 1918, at the same time and in the same building as the annual meeting of the Wisconsin Potato Growers' Association.

It was mainly a business meeting for the purpose of electing officers and presenting the reports of the various committees of the Association, the general programme being furnished by the Wisconsin Association.

Much interest was shown in regard to the grading of potatoes and to co-operative grading, which was very unpopular in 1917, when it was first introduced as a federal measure, being now thought well of by many growers. Field inspection work of crops intended to be sold as seed potatoes is practised in Wisconsin, and certified seed, based on the inspection, is sold.

In connection with the meeting there was a very fine potato exhibition held under the auspices of the Wisconsin Potato Association. This included exhibits of potatoes from the different counties of the state, and also about seventy exhibits of ten bushels of potatoes each representing the general run of potatoes offered for sale by different growers. There were also exhibits of potato machinery, potato by-products, and fertilizers, also of diseases affecting the potato.

The following officers for the Potato Association of America were elected: President W. Stuart, U.S. Department of Agriculture, Washington; Vice-President, W. T. Macoun, Dominion Horticulturist, Ottawa; Secretary, F. H. Douthitt, Market Bank Building, Minneapolis, Minn.; Treasurer, A. G. Tolaasa, Experiment Station, St. Anthony Park, Minn.

The Association publishes a monthly periodical known as *The Potato Magazine*, which is sent out from the Secretary's Office, Minneapolis, Minn.

The Dominion Government was represented at the Meeting by Mr. W. T. Macoun, Dominion Horticulturist, and the Ontario Government by Mr. Justus Miller, Assistant Agricultural Commissioner and Potato Specialist.

The Potato Association of America is international in its scope and the following objects for which the Association was orga-

nized should prove of interest to the readers of THE AGRICULTURAL GAZETTE and to Canadians generally:

(1). To bring together for mutual co-operation and co-ordination of effort all agencies interested in the production, transportation, distribution, and utilization of potatoes, and the promotion of the potato industry in all its phases.

(2). To make a special effort to popularize, and as a result increase, the individual consumption of that most important food product—THE POTATO.

(3). To create a general interest in better seed, true to name and free from disease.

(4). To stimulate the development of new and improved varieties, possessing greater adaptability to special soil or climatic conditions; a higher starch content, greater productiveness, or marked immunity of vine or tuber to disease.

(5). To provide for the proper description of varieties and the establishment of a bureau of registration and nomenclature for new and worthy introductions.

(6). To encourage a system of pure seed certification through field inspection of the growing crop.

(7). To assist in determining varietal adaptation through uniform varietal tests in all parts of the country.

(8). To encourage the coordination of potato investigations by the United States Department of Agriculture and the State Experiment Stations.

(9). To raise the standard of market requirements for table stock through more careful grading and packing, and better eating quality.

(10). To stimulate the investigation of methods for the profitable utilization of surplus and cull potatoes.

(11). To encourage measures designed to safeguard our American industry against the introduction of disease and insect pests.

(12). To establish a more effective system of distribution and marketing.

(13). To encourage the formation of co-operative growing and selling exchanges.

(14). To promote an interest in potato contests and exhibitions.

(15). To establish and maintain a system of crop forecasting for the mutual benefit of all its members.

(16). To collect and disseminate the best available information relating to both the practical and scientific phases involved in increased yields, coupled with a lessened cost.

(17). To have published in daily newspapers, magazines, and other periodicals, news items, recipes, etc., supplied by the Secretary, tending to a more general and abundant use of the potato and potato products.

FEDERATION OF WOMEN'S RURAL ORGANIZATIONS

A movement is on foot to bring about a federation of women's institutes, home economics societies, and homemaker's clubs throughout Canada. An organization meeting will be held in Winnipeg on February 17, 18, and 19, at which it is expected delegates from each of the provinces will be present to work out a constitution and a programme for future action. The movement has been set on foot by Miss MacIsaac, Superintendent of Women's Institutes in Alberta.

WESTERN AGRICULTURE AND ARTS ASSOCIATION

The twenty-second annual meeting of the Western Agriculture and Arts Association was held at Brandon, Manitoba, on December 12th, 1918. The principal matter brought before the association was the report of the Brandon Summer Fair, wh'ch showed that owing to climatic conditions there was a deficiency of ten thousand dollars. However the meeting expressed itself completely satisfied with the management. Mr. R. M. Matheson, of Brandon, was re-elected President and Mr. W. H. Bates, of Brandon, Secretary.

QUEBEC POMOLOGICAL AND FRUIT GROWING SOCIETY

The annual meeting of the Pomological and Fruit Growing Society of Quebec was held at Macdonald College, Ste. Anne de Bellevue, on December the 12th. Father Leopold of La Trappe presided until the election of officers, which resulted as follows: Hon. president, Prof. Wm. Lochhead, Macdonald College; Hon. Vice-president, Z. A. Raymond, Plessisville; President, C. E. Petch, Hemmingford; Vice-president, Rev. Abbe Levasseur, St. Anne de la Pocatiére; Secretary-treasurer, Peter Reid, Chateauguay Basin. The meeting decided that a strong publicity campaign on behalf of Quebec fruit products was desirable. It was decided to take prominent steps toward the establishment of an annual fruit exhibition in Montreal. Resolutions were also passed favouring the continuation in office of the Canada Food Board and urging an increase of the penalty for spraying trees during the blossoming period, so as to prevent injury to the

bee industry. Valuable papers were read by Father Leopold, Prof. T. G. Bunting, Prof. W. T. Macoun, Dominion Horticulturist, Prof. W. H. Chandler, Ithaca, N.Y., and others. Films illustrating strawberry and raspberry culture were shown with explanatory addresses.

ONTARIO HEREFORD BREEDERS' SALE

The inaugural yearly sale of Hereford cattle under the management of the Ontario Hereford Breeders' Association was held in the Winter Fair Buildings, Guelph, Ontario, December 13th, 1918. Upwards of fifty animals were offered for sale, the total amount received being $16,055 and the average price $305. The highest price paid was $860 for the four-year-old heifer Lorna Fairfax, imported from Indiana, and consigned for sale by James Page of Wallacetown. The second highest price was $700, which was paid for the three-year-old heifer Peggy from the herd of John Black and Sons, Amaranth, Ontario.

ONTARIO POULTRY ASSOCIATION

The annual meeting of the Ontario Poultry Association was held in Guelph on December 6, and proved to be the largest attended and most enthusiastic gathering of the Association held in late years. The Secretary, Mr. R. W. Wade, presented the new constitution and it was adopted with little change. The financial statement showed a balance on hand of $560.03. In response to a request the pigeon fanciers were given representation on the Board. The election of officers resulted as follows: President, G. G. Henderson, Hamilton; 1st vice-president, A. G. Field-Marshall, Beamsville; 2nd vice-president, W. R. Graham, O.A.C., Guelph; secretary-treasurer, R. W. Wade, Toronto; assistant-secretary, J. E. Rettie, Toronto.

NEW BRUNSWICK BREEDERS' CONSIGNMENT SALE

Postponed from Nov. 7 to Nov. 21, 1918, on account of the influenza, the New Brunswick breeders' consignment sale at Fredericton, was not the success hoped for. It was the first sale of the kind held in the province and the weather was unfavorable. The prize-winning Holstein bull, Favorit Champion, fetched the highest price, namely $500.00, bid by a Quebec breeder. The highest price paid for a Shorthorn bull was $155.00, given for a yearling, and for a Shorthorn cow $220.00 for a seven-year-old. For the two-year old Ayrshire bull Springbrook Prince George $300.00 was paid. For a flock of Cheviot sheep, consisting of one ram and nine ewes, $615.00 was paid. Horses were not in demand.

NEW BRUNSWICK LIVE STOCK BREEDERS' ASSOCIATION

The evening previous to the breeders' sale on Nov. 21, the New Brunswick Live Stock Breeders' Association was formed with Mr. Thos. G. Hetherington, B.S.A., Provincial Superintendent of Live Stock, as secretary, and the following executive: Horse, J. C. Hewitt, Fredericton; cattle—Shorthorns, R. A. Snowball, Chatham; Holsteins, Thos. Harding, Welsford; Ayrshires, A. C. Taylor, Salisbury; Jerseys, J. H. Manchester, Apohaqui; Sheep, Burder Goodwin, Baie Verte; Swine, W. S. Harding, Hammond, River.

NEW BRUNSWICK AGRICULTURAL SOCIETIES UNITED

At the annual meeting of the New Brunswick Agricultural Societies United, held at Fredericton on Nov. 28th, the officers elected were: President, W. H. Moore, Scotch Lake; vice-president, Charles M. Shaw, Hartland; Secretary-Treasurer, J. D. McKenna, Sussex.

CONSTITUTION OF BREEDERS' ASSOCIATIONS

One of the activities of the agricultural representative in some of the counties has been to organize breeders' associations. One of these associations was organized by Mr. N. C. McKay, District Representative in Bruce County, the annual sale of which was reported in THE AGRICULTURAL GAZETTE of May this year. For the information of those contemplating similiar organizations there is published below the constitution of the North Bruce Breeders' Association:

1. This Organization shall be known as the North Bruce Breeders' Association.

2. The objects of the Association are the promotion of good fellowship among its members and the advancement of the general interests of pure-bred cattle by holding public sales at auction, discussions of the best methods of breeding and rearing cattle, and in other ways extending interest of pure-bred cattle and establishing a reputation for Bruce County as the centre for high class live stock.

3. The membership shall consist of persons who each own at least one pure-bred animal and have paid the required annual fee.

4. Every application for membership shall be passed upon by the board of directors.

5. The officers shall be, president, one or more vice-presidents, and secretary-treasurer. There shall also be not more than ten directors.

6. The Agricultural Representative of the Department of Agriculture shall be ex-officio one of the directors.

7. The executive shall consist of the president, vice-presidents, two directors, and the secretary.

8. The officers and directors shall constitute the board of directors, who shall have entire control and management of the affairs and business of the association, with full power to do what they deem right and proper for the best interest of the association.

9. In the event of any office becoming vacant from any cause, the vacancy shall be filled by the board of directors for the unexpired term of that office.

10. At any meeting of the board of directors duly called, a majority of its member shall constitute a quorum.

11. At any meeting of the association duly called fifteen per cent of the membership shall constitute a quorum.

12. Notice of any proposed amendment to the by-laws shall be handed to the secretary at least 30 days previous to the meeting at which such amendment is to be acted upon, and notices of such proposed amendment shall be sent by the secretary to each member of the association at least one week previous to such meeting.

13. The duties of the officers shall be those customary to such positions in similar organizations.

14. The regular annual meeting of the association shall be held between the first and fifteenth of June each year.

15. Special meetings may be held from time to time as the board of directors deem advisable.

16. Notices of regular or special meetings shall be mailed by the secretary-treasurer to the last known address of each member.

17. The annual membership fee shall be one dollar ($1) payable on or before the 15th day of June in each year for the ensuing year.

THE PATHOLOGICAL SOCIETY

Recently Canada was included as a district of the War Emergency Board of Amercan Plant Pathologists. A meeting was held at the Ontario Agricultural College, Guelph on December 6 and 7 of this district, comprising all the Canadian pathologists that could be brought together. Four of the War Emergency Board Commissioners attended from various districts in the United States. Dr. W. H. Whetzel, Cornell University referred to the results that had already been achieved by speeding up on important problems, such as smut and rust treatment in cereals. He said, however, the outstanding feature of the year's work was the co-operative spirit that had been developed among plant pathologists. Mr. W. P. Fraser, of the Botanical Division of the Experimental farms system undertook to arrange for further co-operative work on cereal troubles. Potato diseases also came in for considerable attention. Other problems that arose for discussion concerned truck diseases, transportation and storage diseases, and timber diseases. The question of the plant quarantine as it affects Canadian interests was also briefly dealt with. It was decided to start at once a Canadian plant disease survey to be carried out by the co-operative effort of Federal and Provincial pathologists, University and Agricultural College experts, and other agencies. The collection of data in connection therewith was placed in the hands of Mr. G. C. Cunningham of the Experimental Farms.

It was decided to form a branch of the American Phytopathological Society, similar to one that already exists on the Pacific coast, and the following officers were elected: President, Professor J. E. Howitt, Ontario Agricultural College, Guelph, Ontario; Vice-president, Mr. W. A. McCubbin, Field Laboratory of Plant Pathology, St. Catharines, Ontario; Secretary-Treasurer, Dr. R. E. Stone, Ontario Agricultural College, Guelph, Ontario.

The meeting concluded by adopting a series of resolutions. These included a suggestion that additional equipment and trained men be provided for the elimination of seed-borne potato diseases; a recommendation that the work in control of cereal diseases now being prosecuted in the West be further developed and extended throughout the Dominion; a suggestion that further steps be taken to eradicate the barberry, and a motion urging Dominion and Provincial authorities to aid in the carrying out of the policy recommended by the International Committee for the suppression of the White Pine Blister Rust. (*See* articles in Vol. V of THE AGRICULTURAL GAZETTE of Canada, pages 186 and 339.)

THE DOMINION GRANGE

The annual meeting of the Dominion Grange was held in Toronto on December 16, 1918, when the following officers were elected: Worthy Master, J. C. Dixon, Moorefield; Worthy Overseer, Howard Bertram, Midhurst; Secretary-Treasurer, Neil E. Burton, Port Stanley, R.R. 2; Assistant Secretary-Treasurer, Miss Hattie Robinson, St. Thomas, R.R. 1; Chaplain, William McCrae, Guelph, R.R. 7; Lecturer, Alfred Gifford, Meaford; Steward, Wm. Oke, Whitby; Assistant Steward, Henry Glendenning, Manilla; Stewardess, Miss Alice Palmer, Port Stanley, R.R. 2; Gatekeeper, W. J. Goodfellow, Allandale; Ceres, Miss M. A. Philp, Whitby; Pomona, Miss Lena Hill, St. Thomas; Flora, Miss M. Thomson, Palmerston, R.R. 3; Auditor, John Pritchard, Gorrie.

ALBERTA PROVINCIAL SHORTHORN BREEDERS' ASSOCIATION

At the annual meeting of the Alberta Provincial Shorthorn Breeders' Association held in Calgary on December 11, the following officers were elected: Honorary President, Hon. Duncan Marshall; Hon. Vice-president, J. Chas. Yule; President, Senator Peter Talbot; First Vice-president, Percy Switzer; Second Vice-president, T. P. Ralphs; Secretary, Chas. Beeching, Nanton, Alta.

ALBERTA ABERDEEN ANGUS ASSOCIATION

The Alberta Aberdeen Angus Association at their annual meeting held on December 11, elected the following officers: Honorary President, G. H. Hutton; President, C. Ellett; First Vice-president, J. F. Day; Second Vice-president, J. J. Bell; Secretary-Treasurer, N. F. Bell, University of Alberta, Edmonton.

ONTARIO CANADIAN SEED GROWERS.

The annual meeting of the Ontario branch of the Canadian Seed Growers' association was held at Guelph during the Winter Fair. A resolution was adopted declaring that no new variety of seeds for farm crops should be sold to the public for seeding purposes before being tested and reported on by the Ontario Agricultural College or other experts. The following officers were elected: President, A. S. Maynard, Chatham; vice-president, Professor W. J. Squirrel, Ontario Agricultural College, Guelph; Secretary-treasurer, W. J. Lennox, Front St., Toronto; Executive committee, A. W. Mason, Ontario Agricultural College, Guelph; A. McMeans, Brantford; R. J. Wilson, Charing Cross, Ontario.

NEW PUBLICATIONS

FEDERAL DEPARTMENT AGRICULTURAL

DOMINION EXPERIMENTAL FARMS

Report of the Experimental Farms.—Issued as an appendix to the report of the Minister of Agriculture, the Report of the Experimental Farms for the fiscal year ending March, 1918, gives a brief review of the year's progress in the various lines of work under way at the Central Farm and the twenty Experimental Farms and Stations distributed over Canada.

THE DIVISION OF ANIMAL HUSBANDRY

The Division of Animal Husbandry has issued a four-page leaflet dealing with "*Recleaned Elevator Screenings* (*Standard Stock Food*) *as a Food for Live Stock.*" The leaflet, which has been prepared by Mr. G. B. Rothwell, B.S.A., Assistant Dominion Animal Husbandman, explains what is meant by "Elevator Screenings" and gives results of experiments that have been made at the Central Experimental Farm, Ottawa.

THE DAIRY AND COLD STORAGE BRANCH

Keep Dairy Herd Records. Circular No. 25 of the Dairy and Cold Storage Branch in eight pages deals with the keeping of dairy records. It gives a statement showing how the records should be kept and also blank forms of application for assistance in the work and for employment as a milk tester, besides notes of interest both to testers and to owners.

THE SEED BRANCH

Pamphlets No. S-3 to S-10, recently issued by the Seed Branch, deal with Ribgrass, also known as Buckhorn, Narrow-Leafed Plantain, English Plantain, Ribwort; Ragweed; Night-Flowering Catchfly or Sticky Cockle; Green Foxtail, or Pigeon Grass or Bottle Grass; Black Medick, also known as Yellow Trefoil Hop Clover, and Hop Trefoil; Sheep Sorrel, known as Sour-Grass, Field Sorrel, and Red Sorrel; Plantains, and Upright Cinquefoil.

Seed Importation Regulations. Pamphlet No. S-12 of the Seed Branch contains the order in council, regulations, instruction under the order in council, and a general explanation of the regulations governing the importation of seed of clover, grasses, vetches, other forage plants, field root and garden vegetables.

PROVINCIAL DEPARTMENTS OF AGRICULTURE

NEW BRUNSWICK

Save Canada's Wheat, Publication No. 36 of the Women's Institute Division contains 32 pages of recipes for making many things in which substitutes are used, the general aim being to save wheat flour as much as possible. Miss Hazel B. McCain, Supervisor of Women's Institutes, and Miss Elizabeth P. Nutter, Demonstrator, are responsible for the contents of the publication.

ONTARIO

The Annual Report of the Bureau of Industries for the Province of Ontario for the year 1917 consists of 48 pages and is divided into two parts, the first giving agricultural statistics and the second dealing with chattel mortgages.

The Annual Reports of the Dairymen's Associations of the Province of Ontario for the Year 1917 have been issued and make a volume of 128 pages. Verbatim reports of the proceedings at the forty-first annual convention of the Dairymen's Association of Eastern Ontario, held at Perth on Jan. 10 and 11, 1918, and of the fifty-first annual convention of the Western Ontario Dairymen's Association, held at Stratford on Jan. 16 and 17, 1918, are given. Reports of the Dairy Branch of the Ontario Agricultural College and of the Eastern Dairy School, Kingston, are also presented.

The Farm Water Supply and Sewage Disposal. Messrs. W. H. Day, B.A., Professor of Physics; R. R. Graham, B.A., B.S.A., Lecturer in Physics; Dan. H. Jones, B.S.A., Professor of Bacteriology; and H. L. Fulmer, B.S.A., Lecturer in Chemistry, have contributed a series of articles on "Farm Water Supply," on the one hand, and the "Disposal of Sewage" on the other. The subjects are thoroughly discussed with numerous enlightening illustrations, the whole making a blue book of 80 pages.

ALBERTA

Rural School Lunches, The Provincial Minister of Education has issued a book of 20 pages dealing very fully with school lunches, the condiments required and the method that should be followed in their preparation for consumption.

MISCELLANEOUS.

The Hawks of the Canadian Prairie Provinces in Their Relation to Agriculture, by P. A. Taverner, form the subject of Museum Bulletin No. 28, published by the Department of Mines. Full descriptions of the different species of hawks are given along with coloured plates of these predatory birds.

Women and Reconstruction.—The women's department of the Canadian Reconstruction Association has issued in a pamphlet of two pages an appeal for the co-operation of Canadian women in solving economic and industrial problems and an examination of the relationship of homes to national business.

NOTES

Mr. James McCaig, M.A., Editor of Publications in the Alberta Department of Agriculture, has had added to his duties that of Publicity Commissioner of Alberta.

The Provincial Department of Agriculture of Quebec have issued a notice stating that the special grant of $75 to societies holding seed grain exhibitions will be continued this year.

The Department of Agriculture of Quebec is offering the agricultural societies, farmers' clubs, co-operative societies, and other agricultural organizations, a number of carloads of linseed oil meal (old process) in 200 lb. bags at $62 per ton, f.o.b. Buffalo, including war tax. The Department is also offering a few carloads of corn from 1,400 to 1,500 bush. at $1.40 per bush., f.o.b. Tiffin, Ont. These feeds were acquired through the Feed Division of the Federal Live Stock Branch.

In order to make a complete canvass of the county for young men to attend the Short Course Schools, Mr. E. P. Bradt, formerly Agricultural Representative in Dundas county Ontario, enrolled the services of junior farmers, school teachers, and a prominent farmer in each school section, each of whom was asked to supply the names of eligible young men. These men are being called together for the purpose of acquainting them with the nature of the courses and enlisting their services in working up a large class.

As forecasted by Mr. W. J. Black, Commissioner under The Agricultural Instruction Act, in his article on "Agricultural Training for Returned Soldiers", that appeared in the December number of THE AGRICULTURAL GAZETTE, training farms are being organized in Great Britain, under the Khaki Unniversity, on which instruction in agriculture will be given to soldiers between the cessation of hostilities and the return of the men to Canada. To assist in organizing the instruction courses to be given on these farms, Mr. C. F. Bailey, Assistant Deputy Minister of Agriculture for Ontario has

been sent to England by the federal Government for a period of about two months. This work will link up the Khaki University with the Soldiers' Settlement Board, of which Mr. Black is Chairman.

A cablegram received from Dr. James W. Robertson, who is at present in London, Eng., with the Dominion peace delegates, addressed to the Canada Food Board, reads as follows:

> "The following minute was passed by the Imports Board of the British Ministry of Food; The chairman expressed the Board's appreciation of the way in which Canada and the Canada Food Board has saved the butter situation in the United Kingdom, by requisitioning butter in the Dominion. This was strongly endorsed by Mr. Metcalf, chairman of the butter section on behalf of that section. He stated that it was entirely due to Canada that the weekly one-ounce ration of butter per person had been maintained."

A writer in *The Monetary Times*, published in Toronto, in dealing with the Grain Growers' Associations of the Prairie Provinces, supplements the particulars regarding these organizations given in THE AGRICULTURAL GAZETTE of December on page 1175. He refers in particular to the growth and development of the Saskatchewan Co-operative Elevator Company. He says that the Company has elevators in nearly every town in Saskatchewan and that they have just finished building one of the largest terminal elevators at Fort William. They have a building in Regina 50 ft. wide by 150 ft. deep. He further says that he found that in the Bank of Hamilton building in Winnipeg, nine stories of the eleven of which the building consists, are devoted to the business of farmers' organizations. The writer quotes these things to show the progress that the farmers of the West have made in the transaction of business.

At the International Live Stock Show recently held in Chicago the team from the Ontario Agricultural College won the live stock judging contest, which was confined to three colleges. The scoring resulted as follows:—Ontario, 3,865; Iowa, 3,824; Nebraska, 3,787. In judging beef cattle C. F. MacKenzie of Ontario was first. In judging sheep R. L. Begg, Ontario, was second and, D. J. Matheson, Ontario, third. In swine judging C. Lamont, Ontario, was first, R. L. Begg, second, and C. F. MacKenzie, third. The college wins the Bronze Trophy; Mr. Begg takes the blue ribbon and gold medal, and Mr. Lamont a silver cup for the highest man in swine. The college secures a medal for the highest score in all classes, a medal for the highest score in sheep, and another for the highest score in swine. This is the fourth time the college has won the premiership in live stock judging at the International.

In an address before the Ottawa branch of the Society of Chemical Industry, Dr. Frank T. Shutt, Dominion Chemist, warmly advocated the formation of a national society of chemists, founded on the same lines as the Institute of Chemistry of Great Britain and Ireland and the Australian Chemical Institute, with fellows and associates. In his advocacy Dr. Shutt referred to the importance of agriculture in the matter of chemical research. He said, "Of agriculture, Canada's largest and most important industry, from an experience of more than 30 years I can speak with some authority and I can unhesitatingly say that all true and permanent progress will be, and must be, based on scientific work and investigation, and I will go further and say that of all the sciences taking part in this work—and they are many—chemistry is the one that above all others will, and must, take the first place. The problems in agriculture that await solution are practically innumerable, and they are varied as to their character and nature; but I venture to say there are few of them that do not call at one stage or another in their working out for the assistance that chemistry only can give. There is a great future for profound chemical investigatory work in agriculture."

It is possibly too soon to attempt any outline of what the agriculture of the next few years may demand. It seems likely, however, that after the period of readjustment there will be a keener competition in the markets of the world than ever before. We have witnessed the great spectacle of the world being fed with millions of men withdrawn from the occupations of production. While some parts of the world have suffered severely, this period will now soon be past, and with the return of men to the soil in all parts of the world we may expect keener competition than existed in the pre-war days. This need not lessen the opportunities in agriculture, but does emphasize the importance of bringing to bear the highest intelligence in order to meet this competition. This must not be merely in the matter of production alone, but on the subjects of farm management and of marketing, The quality of the food offered to the public will not only largely determine the prosperity of the individual but will also determine the prosperity of the country from an agricultural standpoint.

Hon. GEO. S. HENRY, Minister of Agriculture for Ontario in the O.A.C. Review.

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Poisonous Plants on Range Land, Dr. A. Knight, V.S., Chief Veterinary Inspector, page 210.
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The Canadian Countryman, Toronto, Ont., Dec., 7, 1918.
Export of Canadian Dairy Food Products, H. H. Dean, Professor of Dairy Husbandry, Ontario Agricultural College, page 1529.
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Canada as a Producer and Consumer, F. C. Elford, Dominion Poultry Husbandman, Ottawa, Ont., page 461.
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Fruit Growing in Manitoba. F. W. Broderick, Professor of Horticulture, Manitoba Agricultural College, page 1927.
Dec. 5, 1918—Fruit Industry in Eastern Ontario. W. T. Macoun, Dominion Horticulturist, page 1962.
What's in a Name? Prof. Geo. E. Day, Sec., Dominion Shorthorn Breeder's Association, Guelph, Ont., page 2002.
The Dairy Breeds in Canada. Prof. H. H. Dean, page 2010.
Ontario's Great Northland. C. F. Bailey, Assistant Deputy Minister, Ontario Department of Agriculture, page 2013.
The Evolution of the Modern Hen. F. C. Elford, Dominion Poultry Husbandman, page 2016.

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Dec. 4, 1918.—Evolving a Heavy Yielding Corn for Manitoba. Prof. T. J. Harrison, Manitoba Agricultural College. page, 1886.
Where is Wheat Rust Now? Prof. V. W. Jackson, Manitoba Agricultural College, page 1886.
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Agricultural Representative System. W. J. Black, Commissioner of Agriculture, Ottawa, page 1279.

The Grain Grower's Guide, Winnipeg, Man., Nov. 27, 1918.
Dual-Purpose Shorthorns. Geo. E. Day, Sec.-Treas., Dominion Shorthorn Breeders' Association, page 8.
Dec. 4, 1918.—The First Grain in the West. Chester Martin, Professor of History, University of Manitoba, page 58a.

The Nor'-West Farmer, Winnipeg, Man., Nov. 20, 1918.
Education in Agriculture, Jas. McCaig, Editor of Publications, Department of Agriculture, Alberta, page 1516.

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The Belgian Horse. Wade Toole, Professor of Animal Husbandry, O.A.C., page 81.

The Saskatchewan Farmer, Moosejaw, Sask., Dec., 1918.
Feeding the Brood Sow in Winter, G. B. Rothwell, Asst. Dominion Animal Husbandman, page 21.
Winter Housing for Swine. G. H. Hutton, Superintendent, Experimental Station, Lacombe, Alta, page 22.

PART V

The International Institute of Agriculture

FOREIGN AGRICULTURAL INTELLIGENCE

All communications in regard to this section should be addressed to T. K. Doherty International Institute Commissioner, Department of Agriculture, West Block, Ottawa

SCIENCE AND PRACTICE OF AGRICULTURE

GENERAL INFORMATION.

833—**The Influence of Specific Carbohydrates and Grains, Other than Oats, on the Development of Scurvy.**—Pitz, W., in *The Journal of Biological Chemistry*, Vol. XXXIII, No. 3, pp. 471–482, Bibliography. Baltimore, 1918.

835—**The Value of the Yeast Vitamine Fraction as a Supplement to a Rice Diet.**—Emmett, A. D. and McKim, L. H., in *The Journal of Biological Chemistry*, Vol. XXXII, No. 3, pp. 409–419, Bibliography of 9 Publications. Baltimore, Md., December, 1917.

837—**Experiments on the Digestibility of Fish.** Holmes, A. D., in *U. S. Department of Agriculture, Bulletin* No. 649, 14 pp., Washington, April 13, 1918.

In the study of the digestibility of the protein and fat supplied by some common varieties of fish, fish in the form of " fish loaf " was served as the major part of a simple mixed diet, which also included potatoes, crackers, fruit, sugar, and tea or coffee. Considering the experiments as a whole, the total diet supplied on an average 99 gm. of protein, 60 gm. of fat, and 160 gm. of carbohydrates daily, the fuel value being 1,576 calories. The low amount of fat and of carbohydrates was due to the fact that butter and similar fats were omitted and the foods other than fish loaf which supplied both protein and carbohydrates, were limited in order that both the fat and the protein in the diet might be contributed in as large proportion as possible by the fish.

The principal results are summarized in the following table:—

Number of experiments	Kind of fish	Average amount of fish eaten per man per day	Digestibility of fish protein	Digestibility of fish fat
		grams	per cent	per cent
3	Mackerel (*Scomber scombrus*)	448	93·1	95·2
3	Butterfish (*Poronatus triacanthus*)	471	91·9	86·4
8	Grayfish (*Squalus acanthias*)	440	92·8	94·3
4	Salmon (*Oncorhynchus tschawytscha*)	355	93·2	93·7

As these figures show, the average coefficients of digestibility for fish proteins are in close agreement, therefore it would seem, from a dietetic standpoint, that the different fishes studied would supply protein in equally available form. The fats were well assimilated in the case of the mackerel, grayfish, and salmon, which, according to the usual custom, are to be regarded as " fat fishes ". Considering the experiments as a whole, the very complete utilization of the protein and fat supplied by the fishes studied offer additional experimental evidence that fish is a very valuable food and that its extensive use in the dietary is especially desirable.

CROPS AND CULTIVATION.

838—**Movement and Distribution of Moisture in the Soil.**—Harris, F. S. and Turpin, H. W., in *Journal of Agricultural Research*, Vol. X, No. 3, pp. 113–155, Bibliography of 35 Publications. Washington, D.C., July 16, 1917.

During recent years considerable difference of opinion has arisen regarding the importance of the capillary movements of soil moisture and also regarding the laws governing the final distribution of moisture in the soil. In order to solve this problem the authors carried out a series of laboratory and field experiments under irrigation and dry-farming conditions. The experiments represent several thousand moisture determinations. The field studies include the effect of fallow, kind of crop, manure, irrigation water, surface mulches, cultural methods, and seasonal conditions on the movement and distribution of soil moisture. The laboratory

studies include the effect of the initial percentage of moisture, gravity, soil type, source of supply, etc., on the movement and distribution of moisture in the soil.

RESULTS.—In field soils the moisture content of the fallow soils averaged greater than that of the cropped soils.

Unmanured irrigated land showed less difference in moisture between cropped and fallow than did the manured.

Irrigation influenced the top feet of the cropped plots proportionately more than the fallow, but water did not appear to penetrate the fallow plots below 7 feet as readily as it did the cropped ones. Under dry-farming conditions the difference in moisture between cropped and fallow plots was not noticeable until after June 16. Cropped plots showed more fluctuation than fallow ones. Wheat, maize, potatoes, and peas drew most of their moisture from the first 4 feet in depth. The wheat land contained less moisture in the autumn than the other cropped soils, with maize following.

The increase in moisture due to applications of 5 to 7½ inches of irrigation water was felt to depths of 10 feet in 24 hours, although most of the increase was in the first 4 feet.

The effect of mulches in preventing moisture loss under both irrigation and dry-farming was noticeable several feet below the surface of the ground, but the surface foot showed the greatest benefit from mulches. A straw mulch proved considerably better than a 2-inch soil mulch.

Mulches on irrigated plots appear to influence the moisture content of the soil to greater depths than do those under dry-land conditions. A dry-farm plot kept free from weeds in 1916 but not mulched lost very little more water than one mulched 2 inches deep. A 6-inch cultivation on spring-ploughed and a 2-inch cultivation on autumn-ploughed dry-farm land seemed to conserve the moisture best.

Subsoiling 15 inches deep had little influence on the moisture; spring discing was rather a distinct benefit.

An 8-year average shows that spring ploughing under dry-farming conditions at Nephi conserves moisture better than autumn ploughing. This difference in favour of spring ploughing is shown more below the first foot than in the first foot, and more in summer and autumn than in spring.

A precipitation as small as 0.1 inch under dry-farming conditions could not be detected in moisture determinations soon after, but, when as much as 0.5 inch fell within a short time, an increase in moisture was noticed to a depth of 6 feet.

When freely supplied with water, a soil with a high initial percentage of moisture will come to a moisture equilibrium sooner than a drier one, but if given time the drier soil will absorb a greater quantity through a long distance either upward or downward than will the wet one.

The rate of moisture penetration in the first 10 days was nearly twice as great with initial percentages above 15 as with 5 or below, and nearly twice as rapid after a 15-inch irrigation as after a 5-inch one. Under the most favourable conditions 7 feet was influenced in 10 days.

Moisture movement from soils of optimum moisture content into soils of differing initial percentages varied to an extent inversely as the initial content of the dry soil. At the end of six weeks, however, the amount of water actually in the soils still varied directly as the initial percentage.

The higher the percentage of moisture in the soil supplying the water to a dry-soil, the more rapidly and farther from the source of water did the moisture move.

Even when the source of water was an unsaturated soil, greater and faster movement took place when the water was moving downward than upward. When the quantity of soil yielding the water was so small as to make the total moisture content of both moist and dry soils very low if equally distributed, the effect of gravity was not great.

Moisture from a nearly saturated soil moved a greater distance into loam than into sand in 139 days and into sand farther than into clay. The clay, however, contained more moisture in the layer of soil next the water supply than the others and sand contained by far the least.

Sand, with 7·77 per cent of moisture, gave up its moisture to loam much more readily than did the loam with 31·09 or clay with 24·62 per cent of moisture.

The rate of rise of moisture from soils of varying fineness when used either as water sources, or water absorbers varied inversely with the fineness. Water rose to a height of over 30 inches in a loam soil from a moist sand in 94 days, while from a moist clay it rose little more than 6 inches in this length of time. In all soils the most rapid rise of the water was during the period soon after being placed in contact with the water.

Although the rise of the moisture was more rapid in the sand and loam than in the clay, the rise continued steady longer in the clay than in the others.

839—Studies in Soil Reaction as Indicated by the Hydrogen Electrode.—I. PLUMMER, J. K., Studies in Soil Reaction as indicated by the Hydrogen Electrode, in the *Journal of Agricultural Research*, Vol. XII, No. 1, pp. 19–31, Bibliography of 13 Publications. Washington, D.C., January 7, 1918.—II. HOAGLAND, D. R. and SHARP, L. T., Relation of Carbon Dioxide to Soil Reaction as Measured by the Hydrogen Electrode, in the *Journal of Agricultural Research*, Vol. XII, No. 3, pp. 139–148, Bibliography of 11 Publications. Washington, D.C., January 21, 1918.

841—Formation of Black Alkali (Sodium Carbonate) in Calcareous Soils.—

BREAZEALE, J. F., in *Journal of Agricultural Research*, Vol. X, No. 11, pp. 541–589, 26 Figs., Bibliography of 7 Publications. Washington, D.C., September 10, 1917.

With the exception of an adequate water supply, the presence and accumulation of alkali is probably the most important problem that confronts the man engaged in farming under irrigation in the arid and semi-arid regions of the West

As ordinarily used, the term "alkali" indicates the salts of sodium, together with calcium and magnesium salts in lesser amounts. In this paper the term includes all the water-soluble salts of the soil, whether organic, or inorganic. This paper discusses only one specific phase of alkali formation and that is that which takes place when sodium salts are present in a calcareous soil. The conclusions arrived at are as follows:—

1) In the reaction between sodium nitrate (or sodium chloride or sodium sulphate) and calcium carbonate, resulting in the formation of sodium carbonate, the presence of relatively small amounts of calcium nitrate or calcium chloride in the reaction impedes and may prevent the formation of sodium carbonate.

2) The presence of a saturated solution of calcium sulphate in this reaction does not entirely stop the formation of sodium carbonate.

3) Sodium nitrate, sodium chloride and sodium sulphate in the presence of carbon dioxide react with calcium carbonate with the formation of sodium bicarbonate.

4) The presence of relatively small amounts of calcium nitrate or calcium chloride in this reaction impedes and finally prevents the formation of sodium bicarbonate.

5) The presence of calcium sulphate has no effect in preventing the formation of sodium bicarbonate when sodium sulphate or a mixture containing sodium sulphate reacts with calcium carbonate.

6) A field application of gypsum will probably have no effect in overcoming black alkali if the soil already contains soluble sulphates in appreciable amounts, or if the irrigation water contains these salts.

7) Sodium nitrate, sodium chloride, and sodium sulphate increase the solubility of calcium carbonate in the soil.

8) Sodium nitrate, sodium chloride, and sodium sulphate react with calcium carbonate in the soil with the formation of sodium carbonate ("black alkali").

9) Sodium carbonate, formed by the above reaction, decomposes the organic matter of the soil.

10) Calcium carbonate has a slightly destructive action upon the organic matter of the soil.

11) Sodium carbonate is much more destructive to organic matter than sodium bicarbonate.

12) The alkali crusts that accumulate upon the soil in some irrigated regions are due in part to the action of sodium salts upon calcium carbonate with the formation of sodium carbonate.

13) Barren, or "slick", spots are often due to the action of sodium nitrate, sodium chloride, or sodium sulphate upon calcium carbonate with the formation of sodium carbonate.

14) Sodium chloride and sodium sulphate have a protective action upon organic matter in the presence of sodium carbonate.

15) A calcareous hardpan often produces black alkali.

842—Influence of Carbonates of Magnesium and Calcium on Bacteria of Certain Wisconsin Soils.—FULMER, H. L., in *Journal of Agricultural Research*, Vol. XII, No. 8, pp. 463–504, 19 Tables, Bibliography of 64 Publications. Washington, February 25, 1918. (2 pp. in Institute Bulletin.)

845—Leakages from Irrigation Canals and Reservoirs in the U.S.A.— DAVIS, A., in the *Engineering News-Record*, Vol. LXXX, No. 14, pp. 663–665. New York, April 4, 1918.

In numerous cases in the United States the admission of water into irrigation canals and reservoirs has disclosed the existence of subterranean cavities not previously observed. The author quotes three examples of canal troubles (those of Flathead; Grand Valley Lands, Colorado; and Spanish Fork Canal, Utah) and six of difficulties with reservoirs (Jerome and Deer Flat reservoirs, Idaho; Lake McMillan and Hondo reservoir, New Mexico; Walnut Canon reservoir, Arizona; and Tumalo reservoir, Oregon). For each of these he describes the difficulties and the remedies applied, discussing the successes or failures.

Some of the difficulties encountered, especially in canal building, are of such nature that no method of foreseeing them appears to be possible.

In the case of canals, however, these difficulties are usually easily remedied, either by puddling the cavities that appear, as at Flathead and Grand Valley, or by relocation, as at Carlsbad. Remedies in the case of reservoirs are not so easy. Puddling is useless if the subterranean conditions are such that the seepage of water can get away and thus let the seepage continue. No reservoir in earth is of much value if it continuously seeps at the rate that water can pass vertically through puddled earth. The problem then is to avoid regions where subterranean conditions are such that the water can escape. A few rules of caution may be of value:—

1) Avoid reservoirs adjacent to gypsum deposits and to limestone deposits which show evidence of caves.

2) Examine critically reservoirs in volcanic rock, as a few have failed in such locations. Coarse-grained sandstone seems to be an object of suspicion and should be carefully examined.

3) Natural depressions are treacherous and should be examined with care, and if they are near deep canons or underlain with coarse material where water might readily escape, no superficial tightness will avail to make them effective.

847—Fertilizing Value of Ammonium Nitrate —SCHOESING, TH. Jr., in *Le Progrès Agricole et viticole*, Year 35, No. 22, pp. 517-519. Montpellier, June, 1918.

Ammonium nitrate, hitherto little known by farmers because it has never been available in large quantities, will be able to be supplied liberally to them when no longer used for the purposes for which it is required under present circumstances. For this reason the author made tests of its fertilizing value by pot experiments. Maize seeds of equal weight were sown in each pot, which contained about 17 lb. of soil with an initial moisture percentage of 12·9, and 15 gm. bipotassium phosphate as basic fertilizer. Except in the two control pots the nitrogenous fertilizer added to each contained 3·37 gm. of nitrogen; four pots contained ammonium sulphate and four ammonium nitrate. The plants were cut down to the ground at the beginning of earing and the following average weights per pot of the air-dried crop were obtained:—Control pots, 87·6 gm.; pots with ammonium sulphate, 106·8 gm.; pots with ammonium nitrate, 108·4 gm. Ammonium nitrate thus gave an increase in the dried crop almost equal to that of ammonium sulphate.

The soil in the pots was kept very moist. It was found that, although nitric nitrogen fertilizers give slightly heavier crops than ammoniacal nitrogen fertilizers, there is little difference in yield in very wet years.

It is usually admitted that the nitrogen of ammoniacal fertilizers must be nitrified before it can be used by plants. Several workers (MUNTZ, MAZE, SCHLOESING JR.), have, however, shown that absorption occurs in the ammoniacal form as well as in the nitric one. The only difference is in the rate of absorption, a difference which might be explained by an influence of the absorbing properties of the soil on the ammonia. Till it is nitrified ammonia will also be less mobile. For this reason an excess of water, while favouring the equilibrium movements which cause the dissolution of new quantities retained in the soil in proportion as absorption progresses, exercises a very good influence in this case.

871—The Common Honey Bee as an Agent in Plum Pollination.—HENDRICKSON, A. H., in the *College of Agriculture, Agricultural Experiment Station, Berkeley, California, Bulletin* No. 291, pp. 215-236. Berkeley, January, 1918.

The results of these experiments, which are a continuation of those of the preceding year(1), may be summarized as follows:—

The average yield per tree of French (Agen) plums was increased by the use of bees in the orchard, but there was no increase in the yield of the Imperial variety. The percentage of setting was greatly reduced for both varieties when all pollen-carrying insects were kept away from the trees. The percentage of setting in a French plum tree enclosed in a tent of mosquito netting with wooden supports alone or with an Imperial tree and a colony of bees was higher than the orchard average for the variety. An Imperial tree gave a good crop when alone in a tent with bees, but a slightly higher yield than the orchard average when enclosed with a French plum tree and bees. The French plum tree which had given a heavy crop in 1916 when enclosed in netting with bees, gave a very light crop in 1917 when left free. A plum tree which had given a small crop in 1916 when under a tent alone, gave, in 1917, a percentage of setting which was satisfactory although below the general orchard percentage. Both the Imperial trees which had given a small yield in 1916, gave heavy crops in 1917 under open orchard conditions. The percentage of setting of the French varieties was in inverse proportion to their distance from the Imperials.

The results of the two year's work led to the following conclusions:—

(1) Both French and Imperial plum trees set better if hives are placed in the orchard during the flowering period, provided the trees are in normal healthy condition.

(2) If there are no bees in the orchard the percentage of setting of these varieties may be low.

(3) The French plum does not absolutely require to be interplanted with the Imperial, though such interplanting may prove beneficial to both varieties.

LIVE STOCK AND BREEDING

875—Observations on Abortion Disease, in the United States.—SCHROEDER, E. C. and COTTON, W. E., in *The Journal of Agricultural Research*, Vol. XI, No. 1, pp. 9-16 Washington, April 2, 1917.

As far as the writers have been able to learn in their wide experience with the disease, the abortion bacillus is an obligatory parasite. It may live and retain its virulence for a long time in infected material expelled from the uteri of infected cows, but no data are available to support the belief that it can maintain itself or multiply under natural conditions as a saprophyte. Hence, the chronic persistence of the microparasite in the bodies of infected cows is probably the most important among the causes responsible for the propagation, the perpetuation, and wide prevalence of the disease.

The favourite habitat of the abortion bacillus in the bodies of cows is the udder,

(1) See also Agriculture Gazette November 1918, page 1101, No 649.

and the udder is seemingly its only habitat in the bodies of non-pregnant cows. One cow under test for 7 years gave abortion bacilli continuously in her milk. The bacillus was never found in the milk from a cow unless both her milk and her blood serum possessed agglutinating properties for it, but repeatedly cows were found which reacted, but the bacilli were not found in the milk. By experimental inoculation of a cow, the authors were able to demonstrate that the bacilli passed from the udder to the uterus. They believe that the abortion bacilli in ingested milk do not penetrate deeply or abundantly into a calf's body.

876—Contribution to the Study of the Mortality of Calves: Coli-bacillary Broncho-Pneumonia.—COMINOTTI, L., in *La Clinica veterinaria*, Year LXI, No. 7, pp. 167-173. Milan, April 15, 1918.

Under the general term of mortality ("moria") of calves various morbid forms are included that are classified differently by various authors. The predominating form, is, however, coli-bacillosis, though it appears under different clinical, anatomical and pathological aspects. The appended observations were made by the author during protracted researches.

Coli-bacillosis of calves may develop under the clinical, anatomical and pathological form of an acute broncho-pneumonia.

The articular form of coli-bacillosis may, in certain cases, represent a complication of the septicœmic form of uncertain course, owing to a secondary infection by common organisms.

Bacterium coli may cause nodular formations in the liver of calves, as was observed by LANGER for a bacillus of the sub-group *Enteritidis Paratifo* B., and by VALLÉE in pseudo-tuberculosis of calves.

883—Study of the Proteins of Certain Insects with Reference to their Value as Food for Poultry.—MCHARGUE, J. S., in the *Journal of Agricultural Research*, Vol. X, No. 12, pp. 633-637. Bibliography of 9 Publications. Washington, September 17, 1917.

THOMAS was the first to demonstrate experimentally that animal proteins are much superior to vegetable proteins in maintaining the nitrogen equilibrium of the animal body. He showed that the minimum daily quantities necessary to protect body protein from loss were:—meat protein 30 gm., milk protein 31 gm., rice protein 34 gm., potato protein 38 gm., bean protein 54 gm., bread protein 76 gm., maize protein 102 gm.

The author determined the percentage of growth-promoting acids in the proteins of two common insects—the June bug (*Lachnosterna* sp.) and the grasshooper (*Melanoplus* spp.) as compared with the percentage of proteins in roast beef and turkey white meat. He found the following values for each of the two insects respectively:—Ammoniacal, nitrogen, 8.96, 9.14; melanin, 6.78, 3.42; arginin, 11.53, 14.98; histidin, 6.57, 5.62; cystin, 0.35, 0.23; lysin, 8.02, 8.04; amino nitrogen (in filtrate from bases), 50.80, 52.87; non-amino nitrogen (in filtrate from bases), 5.84, 4.32. There is, on the whole, a great similarity in the proteins from such different sources. There is a close agreement in the lysin and arginin contents of the two insects studied and beef and turkey meat. In the beef and turkey the percentage of cystin is almost double and that of histidin two to three times that of the insects.

The protein content of grasshoopers, killed by potassium cyanide, dried at 100° C., (212° F.) ground in a mortar, and kept in closed bottle for seven months, underwent no alteration, thus showing that the dried material can be kept indefinitely. An analysis of the dried matter gave the following percentages:—Protein, 75.28; ether extract, 7.21; crude ash, 5.61. Dried grasshoopers contain more protein than commercial meat meal and would probably be an excellent substitute for it in poultry feeding.

884—Utilization of Farm Wastes in Feeding Livestock in U. S. A.—RAY, S. H., in *U. S. Department of Agriculture, Farmer's Bulletin 873*, pp. 1-12. Washington, D.C., April, 1917.

More than ⅓ of the total production of cereal straw in the United States is not used to advantage, and ½ of this amount is a total loss, the value of which is estimated at more than $100,000,000. In a three years' study of corn-belt cattle the Office of Farm Management found that the breeding herds maintained most largely on oat or wheat straw, maize stover, etc. (with a very small quantity of concentrated feed such as cottonseed meal, maize, etc.), returned the largest profits.

Of all the uses to which straw and maize stover may be put, the only really economical ones are as food or bedding, and, of these two, their use as food is by far the most satisfactory.

To prepare stover for feeding purposes it should be cut and shocked; it may be chopped or shredded if cheap power and labour are available, but otherwise the cost is disproportionate to the advantages gained. Waste is greatly decreased by shredding or cutting dry corn stover and putting it in the silo with water. Of all the methods, ensiling is the most economical. Straw and stover should be used in the fattening rations of all animals except hogs, and should compose the larger part of all winter or maintenance rations for cattle, sheep and horses. Breeding herds of beef cattle, and dairy cows do well on rations composed largely of these products; the same applies to ewes if some grain is added. Horses doing very light work or none at all need little grain if they have a liberal allowance of clean straw or stover. Rye straw should not be fed to dairy cattle, because of its toughness and the danger from ergot, and buckwheat straw,

on account of its low food value, should only be given when other roughages are not available. When barley straw is used the mouths of the cattle should be examined occasionally as the dry, stiff beards are apt to set up irritation.

The following rations are proposed for various classes of animals:—

BEEF CATTLE. *Winter rations.*—

1) Straw, 10 lb.; silage, 20 lb.; cottonseed or linseed meal, 1 lb.
2) Straw, 20 lb.; cottonseed or oil cake, 2 lb.
3) Straw, 10 lb.; maize fodder, 10 lb.; cottonseed or linseed meal, 1 lb.
4) Stover, 35 lb.; cottonseed or linseed oil meal, 1 lb.

Fattening rations (for 1,000 lb. steers).—

1) Straw, 5 lb.; silage, 18 lb.: maize, 12 lb.
2) Straw, 8 lb.; leguminous hay, 6 lb.; cottonseed or linseed cake, 5 lb.
3) Stover, 10 lb.; silage, 15 lb.; maize, 12 lb.
4) Straw, 5 lb.; stover, 15 lb.; maize, 6 lb.; cottonseed meal, 3 lb.

DAIRY CATTLE. *Ration for dry cows, bulls and heifers.*—

Maize stover and straw, unlimited; clover hay, 10 lb.; maize silage, 20 lb.; cottonseed meal, 1 lb.; maize-and-cob meal, 2 lb.

Ration for cows about to calve.—

Maize stover, 5 lb.; clover hay, 12 lb.; maize silage, 25 lb.; wheat bran, 3 lb.

Ration for cow giving 16 lb. of 4% milk.—

Maize stover and straw, unlimited; clover hay, 12 lb.; maize silage, 20 lb.; cottonseed meal, 2 lb.; maize-and-cob meal, 3 lb.

Ration for cow giving from 20 to 25 lb. of 4% milk.—

Maize stover and straw, unlimited; clover hay, 12 lb.; maize silage, 25 lb.; cottonseed meal, 2 lb.; maize-and-cob meal, 3 lb.; gluten feed, 3 lb.

SHEEP. (Supplementary rations with a little grain).—

1) Maize stover, 2 lb. (amount eaten, not amount fed); leguminous hay, 2 lb.
2) Oat straw, 2 lb.; leguminous hay, 2 lb.;
3) Oat straw or maize stover, 1 lb.; silage, 1½ lb.; leguminous hay, 2 lb.

HORSES. *Maintenance rations for 1,000 lb. idle horse.*—

1) Maize stover, 9 lb.; alfalfa hay, 3 lb.; maize-on-cob, 5 lb.
2) Oat straw, 8 lb.; alfalfa, 8 lb.; cane molasses, 3 lb.

Daily ration for 1,000 lb. horse at light work.—

Maize stover, 5 lb.; Bermuda hay, 5 lb.; cottonseed meal, ½ lb.; cowpeas, 2 lb.; shelled maize, 5 lb.

Daily ration for 1,000 lb. horse at heavy work.—

Maize fodder, 4 lb.; alfalfa, 12 lb.; ground soy beans, 1 lb.; shelled maized, 12 lb.

Daily rations for 1,250 lb. idle horse.—

1) Maize stover, 11 lb.; alfalfa, 5 lb.; ear maize, 4 lb.
2) Oat straw, 10 lb.; pea hay, 4 lb.; common beets (or other roots or silage,) 4 lb.; oats, 4 lb.

Daily ration for 1,250 lb. horse at light work.—

Barley straw, 5 lb.; alfalfa hay, 6 lb.; rolled barley, 8 lb.

Daily ration for 1,500 lb. idle horse.—

Maize fodder (with ears), 18 lb.; alfalfa, 5 lb.

886—Oatless Rations for Draught Horses.—DECHAMBRE, M. P., in *Comptes rendus des Séances de l'Academie d'Agriculture de France*, Vol. IV, No. 15, pp. 480-497. Paris, May 1, 1918. (2 pp. in Institute Bulletin.)

887—Winter Steer Feeding Experiments in Indiana, U. S. A.—SKINNER, J. H. and KING, F. G., in *Purdue University Agricultural Experiment Station Bulletin No.* 206, Vol. XX, pp. 1-28. Lafayette, Indiana, September, 1917. (4 pp. in Institute Bulletin).

888—The Relation of the Quality of Proteins to Milk Production.—HART, E. B. and HUMPHREY, G. C.: I. with the co-operation of SCHAAL, A. A. II. with the co-operation of SURE, BARNETT, in *The Journal of Biological Chemistry*, Vol. XXVI. No. 2, p. 457-471, September, 1916; Vol. XXXI, No. 2, pp. 445-460, August, 1917, Baltimore, Md.

FARM ENGINEERING

891—Electricity in Agriculture: Consumption, Distribution and Ploughing.—TARCHETTI, A., in *Il Giornale di Risicoltura*, Year VIII, No. 2, pp. 25-30, No. 3, pp. 41-46. Vercelli, February 28 and March 31, 1918. (2 pp. in Institute Bulletin).

892—The Transformation of Motorcars and Motor-lorries into Agricultural Tractors and Windlasses (Landrin System).—FREMIER, V., in *Le Génie Rural*, Year X, No. 81, pp. 9-10. Paris, 1918.

893—A Study of the Plough Bottom and its Action upon the Furrow Slice.—WHITE, E. A. in the *Journal of Agricultural Research*, Vol. XII, No. 4, pp. 149-182. Washington, January 28, 1918.

894—The Russell Turnip Thinner.—*The Implement and Machinery Review*, Vol. XXXXIV, No. 517, p. 72 London, May 1, 1918.

There exists no turnip thinner that leaves only a single plant, but with a good machine, it is possible to leave a very small bunch of plants at regular intervals. A satisfactory machine which has proved its worth has been constructed by the MALDEN IRON WORKS Co., Ltd., Maldon, Essex. It may be used for thinning roots in general.

The RUSSELL thinner is provided with a serrated cutter, which can be quickly adjusted

to leave very small or large bunches of plants. The thinning apparatus is nicely balanced, and is entirely under the control of the man working the machine. If the crop is patchy, the attendant can lift the cutters so that plants required to be left in are not taken out. The machine is fitted with 5 speeds, for gapping 8, 10, 12, 14 or 16 inches, whilst the cutting apparatus and road wheels are arranged to slide along the axle to suit varying widths of row.

896—Safety Devices for Chaff-cutters.—I. MASSARELLI, F., in *La sicurezza e l'Igiene nell' Industria*, Year III, No. 6, pp. 131-147. Milan, December 31, 1916.—II. BERTONI, C., in *Il Coltivatore*, Year LXIV, No. 1, pp. 6-10, Casale, January 10, 1918.

The author considers fly-wheel chaff-cutters, which are the most used, and the means of preventing the accidents that are so common with these machines. These accidents can be classified as:—*a*) accidents due to the fly-wheel; *b*) accidents due to the feed rollers, *c*) accidents due to the gearing and drive in general. The safety devices applied to chaff-cutters are based on two different principles:—

(1) Devices stopping or changing the movement of the feed rollers and platform by quickly moving suitable mechanisms by the hand or foot. The devices, though improving, the working qualities of the machine are only relatively efficacious, as they are rather *attenuating* than *preventive* devices and should be supplemented by others.

(2) Devices, automatic or not, that make it impossible to pass the arm or hand beyond a certain limit into the mouth where the forage enters. For hand-driven fly-wheel chaff-cutters, the author describes guards, made of wood, cast-iron, sheet iron, or grating. As regards protection against accidents that might happen when feeding the machine, a board, fixed on the edge of the hopper, and of sufficient length, will prevent the arm passing beyond a safe limit.

One of the essential conditions for the safety of machine-driven chaff-cutters is that there should be both a fixed and free pulley together with the disengaging gear that is so often lacking in the older machines. It should be so made that the belt cannot suddenly slip from the free on to the fixed pulley and thus start the machine. A lever disengaging gear mounted on a bracket is very suitable for belt-driven chaff-cutters, which should have a guard for the fly-wheel and a lattice protecting the knives.

This lattice, even when lowered on the feed-trough, allows the workman to see the position of his hands and watch the work more closely, and as it is connected by a lever to the side mechanism controlling the cylinders and feed platform, if the workman's hands happen to pass into a dangerous position, the lattice lifts, thus stopping or reversing the movement.

900—Rapid House Construction with Concrete Studs.—*Engineering News-Record*, Vol. LXXX, No. 13, pp. 604-606 + 3 Figs. + 2 plans. New York, March 28, 1918.

The description of a new method of house construction with fireresistant walls made of cement stucco on metal laths.

RURAL ECONOMICS

901—Study of Some Egyptian Farms.—BAROIS, C., in *Comptes rendus des Séances de l'Academie d'Agriculture de France*, Vol. IV, No. 13, pp. 417-427. Paris, April 10, 1918. (3 pp. in Institute Bulletin).

The author describes some capitalist farms in Egypt with the intention of pointing out to the French public the advantages capitalist colonial enterprise, if well managed, may offer to French investment. The following is a summary of the descriptions of five farms given in the original Institute Bulletin:

Kom-Ombo Farm.—Consists of 32,000 acres on the banks of the Nile, 500 miles south of Cairo. It was desert land, never reached by the waters of the river, and it was necessary to install a system of irrigation costing nearly $5,000,000. The land is cultivated either by the tenants for cereals, or in conjunction with the fellahs and the company for these crops and for cotton, or directly for sugar cane. In 1916 the cultivation of sugar cane which covered 27% of the area cultivated brought a gross profit of $750,000 compared with $390,000 from all the other crops together.

Cheikh Fadl Farm.—Situated in central Egypt, contains 9,200 acres and must be irrigated by pumping. All the land is let out to farmers. Besides cereals, beans, corn and clover, the principal crop is sugar cane. Each year the company pays its shareholders 5½%.

Ouady Toumilat Farm.—An estate of 21,250 acres in a hollow in the desert between the Delta and the Suez Canal. The land which had deteriorated owing to infiltration from a large public canal has been largely reclaimed for cultivation and is now being profitably worked.

Sakha and Santa Farms.—Two estates with abundant yields situated in the best part of the Delta. The profits per acre in 1912 were $15 and $35, respectively.

The author urges that such enterprises should not be entered into before the subject has been thoroughly studied and numerous extensive experiments made.

902—Studies in the Cost of Market Milk Production in the United States.—ANDERSON, A. C. and RIDDELL, F. T. in *The Journal of Dairy Science*, Vol. I, No. 2, pp. 181-184. Baltimore, July, 1917.

The data presented in these studies cover a period of two years, from 1914 to 1916, and

include figures from 25 farms near Grand Rapids, Michigan. Most of the other figures secured on this point in the United States were collected in New England or Atlantic Coast States. The data were secured by a one day visit to each farm monthly. All the farms visited, produced market milk, some of them being dairy farms solely, although most of them were coupled with grain, vegetables, live stock or fruit production, and each farm was conducted according to the ideas of the owner or operator. The average expenditures of the farms visited were as shown in Table I.

Items of expenditure	1914	1915
Total number of farms	25	25
Average number of cows per year	459·4	428·57
Man labour	$ 28·68	27·19
Hauling milk and other horse labour	15·54	14·77
Feeds:		
Roughage	31·02	30·38
Concentrates	28·61	26·68
Pastures	8·36	7·66
Cash sundries	1·96	1·77
Veterinary services and drugs	0·86	0·99
Taxes, interest and depreciation on herd	9·88	9·49
Taxes, interest, insurance and depreciation on buildings	8·72	10·33
Depreciation on barn tools and dairy utensils	0·50	0·48
Actual losses on live stock	1·95	6·25
Added earning power of owner due to knowledge, experience, and interest in excess of that possessed and used by ordinary labour	6·00	6·00
Added risk due to instability of market for product as whole milk, which in single years amounts to 30 per cent, and in one year out of every five would be 6 per cent.	8·47	8·30
Total	150·57	150·29

The average receipts of the farms visited, for the dairy, were as shown in Table II.

The authors bring in a new point, that of "instability of market for product as whole milk" which in a single year may amount to 30 per cent and occurs, as they estimate, one year in five, which would be 6% of the total cost of production in this case $8.47 for 1914, and $8.30 for 1915.

Items of receipts	1914	1915
Average pounds of milk produced	6 928 lb.	7 156·8 lb.
Gallons of milk produced	834·70 gal.	862·3 gal.
Average price per gallon delivered into Grand Rapids	16·90 cent.	16·35 cents.
Value of milk produced	$ 141·35	$ 139·01
Credit by manure	17·45	17·59
Total value of products per cow	158·80	156·60
Net profit per cow	8·23	6·31
Cost of production per gallon	15·90 cents.	15·39 cents.
Net profit per gallon	1·0 cents.	0·7 cents
Cost of production and delivery per hundred pounds	$ 1·916	$ 1·854
Cost of production per quart	3·475cents.	3·848cents.

The investment on the farms studied, expressed in percentage is as follows:—

Investment in cattle	45%
Investment in buildings	54 "
Investment in equipment	1 "

For 1915 the distribution of cost factors was as follows, expressed in percentage:—

Grain	17·8%
Roughage	20·2
Pasture	5·1
Hauling milk	9·8
Man labour	18·1
Market losses	5·5
Taxes, interest and depreciation on buildings.	6·9
Same on cows	6·3
Losses on cows (tuberculosis, etc.)	4·1
Management	4·0
Depreciation on tools, etc.	0·3
Veterinary services	0·7
Cash items	1·2

The authors point out that during the last two years the cost of labour has increased 25%, concentrated feed 30 to 35%, roughage 10%, and minor supplies and milk room equipment 25 to 60 per cent.

AGRICULTURAL INDUSTRIES.

903—The Intrinsic Values of Grain, Cottonseed, Flour and Similar Products, Based on the Dry-Matter Content.—BOERNER, E. G., *U. S. Department of Agriculture, Bulletin* No. 374, pp. 1-32. Washington, D.C., October 17, 1916. (2 pp. in Institute Bulletin.)

905—The Beet Sugar Industry in the Netherlands.—GOOSSENS, G., in *In en Uitwoer*, Year III, Nos. 7 and 9, pp. 151-

152 and 200-202. Antverp., February 13 and 27, 1918.

906—**The Fat of the Residue of the Decortication of Rice.**—GARELLI, FELICE, in *Annali della R. Accademia d'Agricoltura di Torino*, Vol. LX, p.. 132-139. Turin, 1917.

909—**Preliminary Note on Certain Changes in Some of the Nitrogenous Constituents of Milk Caused by Bacteria.**—SUPPLEE, G. C., in *The Journal of Dairy Science*, Vol. I., No. 4, pp. 313-319. Baltimore & London, November, 1917.

911—**Methods Adopted in the Production of "Clotted Cream" in Devonshire and Cornwall, England.**—SADLER, W., in the *Journal of Dairy Science*, Vol. I, No. 4, pp. 291-302. Baltimore & London, November, 1917.

Enquiries have been conducted on behalf of the Board of Agriculture as to the methods adopted by the producers of "clotted cream" in the counties of Devonshire and Cornwall in England. Experiments have subsequently been undertaken at the Midland Agricultural and Dairy College, Kingston, Derby.

The results of these experiments so far tend to show:—

1) That provided a suitable system be adopted and reasonable care be taken in management and manipulation, clotted cream having the typical and characteristic properties can be produced in any district.

2) That, while a rich milk is preferable, it is not essential for the production of characteristic clotted cream to have only the breeds of cattle favoured by the producers in Devonshire and Cornwall.

3) That the flavour and keeping properties of the cream are problems of a bacteriological nature.

4) "Scalding" for 20 to 30 minutes with a final temperature of 187° F. proved to be a satisfactory procedure.

5) One pound of clotted cream was produced from 23 pounds of milk.

6) The average percentage of butterfat in the clotted cream was 62 to 64 per cent.

7) The average butterfat content of the scald milk was 0.75 per cent.

912—**Studies in Butter Shrinkage.**—GUTHRIE, E. S., in the *Journal of Dairy Science*, Vol. I, No. 2, pp. 136-138. Baltimore, July, 1917.

The Dairy Division of the Cornell University has completed the storage studies of 100 tubs of butter. This butter was made in eight different churnings from sweet pasteurised cream. The body was good and the moisture was nicely incorporated. All the butter was overworked somewhat, which has a tendency to complete the incorporation of the water. The tubs were paraffined, and were weighed just before the butter was packed in them. The butter was weighed on November 20 after being in cold storage for 134 days at 0° to 10° F. The shrinkage or increase in weight was determined for each tub.

Seventeen packages showed an increase in weight ranging from 0.5 ounce to 27.5 ounces. Eighty three tubs showed shrinkage which varied from 0.5 ounce to 15.5 ounces. The total shrinkage was 377.5 ounces. The total increase of weight was 85 ounces. The net shrinkage was 292.5 ounces, or 18.28 pounds, which is 0.1828 pound for tub or 0.29 per cent.

913—**The Relation of *Oidium lactis* and *Penicillium* to the Keeping Qualities of Butter.**—COMBS, W. B. and ECKLES, C. H., in the *Journal of Dairy Science*, Vol. I, No. 4, pp. 347-355. Baltimore and London, November, 1917.

914—**Varieties of Cheese: Descriptions and Analyses.**—DOANE, C. F. and LAWSON, H. W., in *U. S. Department of Agriculture, Bulletin No. 608*, pp. 80 + Bibliography of 103 Publications. Washington, March 6, 1918.

This bulletin gives descriptions of 287 different cheeses and analyses of 129 varieties extracted from the books and technical periodicals of the producing countries. The varieties are arranged in alphabetical order, It is pointed out that one type of cheese is frequently known under different names, thus making classification difficult.

915—**Study on the Normal Production of Gas in Cheese: Investigations at the Agricultural Experiment Station at Hoorn, Netherlands.** — BOEKHOUT, F. W. and VRIES, J. J. OTTIDE, in *Verslagen van Landbouwkundige Onderzoekingen de Rykslandbouwproefstations* No. XXI, pp. 14-28 + I Plate. The Hague 1917.

916—**The Growth of Green Mould (*Penicillium glaucum*) for the Manufacture of Blue Cheeses.**—CHAVASTELON, R., in *Comptes rendus des Séances de l'Académie d'Agriculture de France*, Vol. IV, No. 18, pp. 564-566. Paris, May 22, 1916.

920—**The Influence of Salt on the Changes Taking Place in Storage Butter.**—WASHBURN, R. M. and DAHLBERG, A. C., in the *Journal of Dairy Science*. Vol. I No. 2, pp. 114-126. Baltimore, July, 1917.

It is generally believed, and most experimental evidence supports this belief, that salt improves the keeping quality of butter. It has been observed, on the other hand, that unsalted butter in commercial cold storage keeps as well as or better than salted butter.

The experiment reported in this paper deals with this point and considers only salted versus unsalted butter. The butter was first held for the usual cold storage period in a commercial cold storage butter room and was then held for a short time at the usual ice box temperature. This latter

treatment is comparable to that which commercially stored butter would receive before being consumed. At each scoring the usual bacteriological and chemical analyses were made so that probable causes of a possible difference would not be overlooked.

Making, Storing, and Scoring the Butter.—The cream used was sweet, clean cream of good flavour. It was ripened without pasteurization on the addition of a starter to an average acidity of 0·58 per cent lactic acid. It churned in 20 to 30 minutes; the churning was stopped at the wheat kernel stage; the butter was washed twice, salted or not, and worked from 23 to 27 revolutions in a Victor double roller churn. Half the butter of each churning was salted and worked and the other half worked unsalted so that each sample of unsalted butter had an exact duplicate in the salted butter. It was then packed into 5 pound paraffined wooden butter drums lined with parchment paper. Enough of these containers were packed so that one from each lot could be taken out at every scoring. Initial data as to score, chemical and bacteriological analysis were obtained. The butter was stored in a commercial butter storage room in St. Paul, at a temperature of —15° F. After 284 days in cold storage it was held for twenty days in a butter-cutting room at 58° to 60° F.

The following points were studied:—Influence of salt on score; influence of salt on bacterial activity; influence of salt on acidity; influence of salt on moisture, protein content; relation of score, acidity and bacteria in salted and unsalted butter. The following facts were brought out:—

Salt, exclusive of its antiseptic property, hastened the deterioration of the butter.

When stored at —15° F. unsalted butter kept as well as salted butter.

The bacteria in the unsalted butter decreased more rapidly at—15° F, than they did in the salted butter and increased more rapidly at 58° F.

The acidity of the unsalted and the salted butter increased uniformly at—15° F. but at 58° F. the increase was greater in the unsalted butter.

Moisture was lost from the salted butter, but not from the unsalted kept at —15° F.

Little if any relationship existed between the bacteria, the acidity, and the score in this butter.

INJURIOUS VERTEBRATES

949—The Control of Field Mice by Acetylene Gas.—(PAPAGEORGIOU, P.) in *Bulletin of the Royal Hellenic Society of Agriculture*, Vol. X, No. III. pp. 3179-3182 + 1 Fig. Athens, 1918.

The author reports the very satisfactory results obtained by him at the Agricultural Station of Thessaly with a new acetylene gas method for destroying field mice. In many parts of the vast cereal-producing plain of Thessaly field mice, aided by favourable conditions, have multiplied so considerably that they are a serious menace to the coming harvest. In the absence of other chemical products, such as strychnine, carbon bisulphide, etc., the author applied calcium carbide, produced in large quantities by a local firm working a water fall at Gorgopotamos, near Lamia. Small pieces of calcium carbide the size of a pea are placed in the holes dug by the mice, a little water poured in and the holes stopped up. The mice are suffocated by the gas. If new holes open in two or three days the procedure is repeated. The method is harmless to those using it, easy to apply, and cheap.

AGRICULTURAL ECONOMICS

AGRICULTURAL CO-OPERATION IN SCOTLAND

THE BEGINNING OF CO-OPERATION

While Ireland led the way in the United Kingdom in the co-operative organization of agriculture, England and Wales came second and Scotland was last. The tradition of Scotish agriculture is strongly individualistic, and its achievement—the success which has attended the long and patient efforts to extend the area of cultivation, and the standard maintained both in arable farming and in the breeding and feeding of live stock—has produced a legitimate pride in individual enterprise and skill. Common action has not however been entirely wanting. There have been numerous farmers' clubs and societies, many of them existing for the purpose of holding annual shows which encourage the improvement of stock and of crops. The long-established Highland and Agricultural Society has the first place among these. The more recently founded Scottish Chamber of Agriculture is the most important of other associations which aim at promoting the general policital and social interests of the farming community.

Co-operative trading was little practised by the Scottish farmer until the early years of the twentieth century. At that time agriculture was recovering, in Scotland as in England, from the depression of the nineties. The bad years had made prominent the difficulties inherent in an industry carried on by a multitude of relatively small enterprises. There were the difficulty due to the high cost of materials procured in

small quantites, the difficulty of obtaining guarantees of the cost of these materials, the difficulty of finding a market for perishable produce, the difficulty of obtaining credit from the existing banks, the difficulty of the relatively high cost of insuring live stock. All these obstacles to prosperity affected most the small farmer, especially the small farmer in a remote district.

In 1904 a Scottish Agricultural Commission visited Denmark, and its subsequent report dealt largely with the success which Danish farmers have achieved by co-operating in the preparation and sale of their produce and the purchase of their requisites. They have fostered this success by a system of agricultural education which is closely associated with co-operation. The report bore fruit at a meeting held on January 18, 1905, under the auspices of the Scottish Chamber of Agriculture when a committee was appointed to "formulate a scheme for extending the benefits of co-operation to Scottish agriculturists, with powers to take such action as may appear expedient for giving the same practical effect". The result was the foundation of the Scottish Agricultural Organization Society.

THE SCOTTISH AGRICULTURAL ORGANIZATION SOCIETY

Constitution and Finance.—The Scottish Agricultural Organization Society was founded on October 25, 1905. It is a purely propagandist body. It devotes itself to the formation and encouragement of local co-operative societies, but does not itself engage in trade, nor does it concern itself with the general social or political interests of the agricultural community.

A guaranteed fund of £1000 was subscribed when the society was founded, and active steps were taken to ensure that there should be such a membership as would cause annual subscriptions to provide a considerable fund. Every member of the society, whether an individual or a body corporate, must hold one fully paid-up share of £1. If a member is a landowner he subscribes at least £1 a year, otherwise at least 5*s.* a year. Additional money was raised by means of a special donation fund, to which most of the contributors were landowners and which was brought up to £1000. In its early years the society was supported wholly by the subscriptions and by voluntary contributions, and the guarantee fund was annually drawn on to the extent of quite £500. In view however of the national importance of the work the Development Commissioners made in 1911 a grant of half the total expenses which the society incurred in each year. At first this grant was paid through the Scottish Education Department, but in 1912 its administration and the consequent supervision of the society's affairs were transferred to the newly constituted Board of Agriculture for Scotland. In 1916 the grant amounted to £648.

The affairs of the Scottish Agricultural Organization Society are managed by a president, a vice-president and an executive committee; and it is a condition of the government grant that this committee include two representatives appointed by each of the three colleges of agriculture and one appointed by the chairman of the county councils of crofting counties. There is a secretary who acts as general organizer; and in 1913 there were also a chief assistant organizer, an assistant organizer, and a special organizer whose work was connected with fishermen's co-operation. In 1914 a special grant was made by the Development Commissioners for the appointment of a Gaelic speaking assistant organizer to work in the Hebrides. The war has greatly depleted the staff.

A special Highland branch of the society was founded in 1908 to promote the co-operative movement in the north and north-west. It has its headquarters at Inverness. Branches of this type have been set up from time to time in other parts of the country.

The Scottish Agricultural Organization Society itself and all the societies affiliated to it are registered under the Friendly Societies' Act and have limited liability. Each affiliated society is an independent unit, but the steps preliminary to its formation are guided by the parent society, which also provides for the auditing of its books and, if necessary, for the instruction of its secretary and treasurer in the required methods of book-keeping.

B. *The Affiliated Societies.*—In pursuing its aims the Organization Society at first met with many obstacles. The conservative and critical spirit of Scottish farmers was reinforced by the active opposition of the local dealers who found their position as middlemen between the farmers and the manufacturers and merchants threatened. Generally speaking the occupiers of medium sized farms, the small holders and the crofters carried on the business both of purchase and of sale with these dealers and the results were on the whole unsatisfactory. Credit was given for a year or longer and in the remoter districts a system of barter was very prevalent.

Gradually the society gained public confidence and in the thirteen years of its existence it has achieved a noteworthy success. Among the local societies it has organized are:

Poultry and Purchasing Societies.—At the end of 1917 there were 70 of these societies. In 1912 the Scottish Farm and Poultry Produce Federation, Ltd., was formed to act as a marketing agency for the co-operative societies. It keeps the local societies constantly informed as to price.

Co-operative Dairies.—The Organization Society appointed, soon after its foundation, a special dairy committee to consider the matter of co-operation among dairy farmers. The district of North Ayrshire was chosen

for experiment, and in 1917 there were seven dairy associations formed into a federation to advance their common interests. Kilmaurs Dairy Association, Limited, affords a good example of a well conducted co-operative dairy. Its depot was largely built and equipped with the money provided by members, some loans being also received from local landowners. The members hold 1,504 shares, and 5 per cent is paid on the paid up share capital. The total average cost of handling the milk is 0.66 of a penny per gallon.

Stock-breeding Associations.—In recent years many local stock-breeding associations have been formed, generally in connection with the schemes of the Board of agriculture for improving the breeds of horses and cattle, and without doubt they have been encouraged by the popularization of the co-operative principle for which the Organization Society is responsible.

The Organization Society has also formed fifty purchase societies, one fishery society, one credit society, and one bee-keeping society.

THE ECONOMIC SITUATION IN ARGENTINA

The year 1917 has not sensibly improved the Argentine economic situation. The defective harvest of 1916-1917 was a handicap in the first months of the year, and subsequent difficulties of various kinds impeded the progress of business in the country; the rarefaction and costliness of means of maritime transport much hindered the realization of the value of products; strikes among the employees of railways and factories were obstacles to the exercise of a spirit of enterprise; and the uncertainty of the political situation contributed to a similar state of affairs. But although the improvement of business in Argentina was not what it might have been it yet made itself felt in the latter part of the year, thanks to the prospect of a 1917-1918 grain harvest better as regards quantity and value than that of preceding years, and thanks to the flourishing condition of stockfarming of all kinds. The products of stockfarming— meat, wool and leather— reached very high prices when they were exported, and this ensured a balance of trade in favour of the country and gave it large available financial resources. Consequently the percentage of gold which guaranteed the paper circulation reached 75, and this had a very favourable influence on the Argentine exchange.

Since the year 1917 has closed this improvement in the situation of the country has been accentuated. There has been a fine grain harvest almost throughout the cultivated territory. Agreement between the Argentine and various other governments for the purchase by the latter of this harvest, and for exporting and handling it, have secured that its value will be realized in good conditions and have eliminated all risks of a speculation injurious to the products market and the rate of exchange.

It can be asserted already that the uneasiness which prevented the resumption of business in Argentina is being dissipated gradually; and it may be anticipated that it will completely disappear and will gave place to a new era of activity so soon as international relations have returned to their normal course. The important financial resources which are constituted by the unemployed capital accumulated in banks, and which amounted on the 31st of last December to nearly five thousand million francs, will revert to land business and agriculture, the only investments which Argentines appreciate.

CONTENTS OF THE INSTITUTE ECONOMIC BULLETIN

In addition to those already dealt with herein, the following is a list of the more important subjects treated in the June number of *The International Review of Agricultural Economics.* Persons interested in any of the articles in this list may obtain the original bulletin on application to the Institute Branch, so long as the supply for distribution is not exhausted:

AGRICULTURAL STATISTICS

FOOD PROSPECTS UNDER PEACE CONDITIONS

BY T. K. DOHERTY, LL.B.

Heretofore, in discussing the food questions, much attention has been given to wheat. However, following the rise in price there has arisen a greater demand for the cheaper cereals as substitutes. Hence the keen interest in examining the supplies of other food and feed crops. The cereals other than wheat are of present concern, not only because of their greater direct utilization recently as human food, but because of their indirect contribution thereto through being fed to animals. Therefore, there is in this article an attempt to take, in respect to these cereals, an inventory of the world's production and to estimate the world's present and prospective consumption and trade in each case, comparing recent data with the data officially ascertained on an average of five years immediately preceding the outbreak of the war. Fuller details are given in regard to the North American cereal situation, and there is incidentally some reference to live stock and population in so far as they have a direct bearing on cereal production.

The "Statistical Notes on Cereals," published by the International Institute of Agriculture, in April and October, afford excellent data for such consideration, and for comparing recent conditions with those prevalent before the war. The pre-war period may be taken as representing the normal state of international trade towards which there will now be a strong tendency to revert. Let us first take up the pre-war period.

These "Statistical Notes" of the Institute are for this period comparatively complete, and cover nearly all the countries whose trade is of importance. They relate to wheat, rye, barley. oats and maize, particularly for the five year pre-war average. These five cereals are presented together in two groups, according as each country shows a net import or a net export balance. They are also considered separately for the countries closed to commerce, viz.: Germany, Austria-Hungary, Bulgaria, Belgium, Roumania and Russia.

TABLE I.—*Average Net Imports of Cereals for the Years 1909-10 to 1913-14.*

(Thousands of bushels)

Countries.	Wheat	Rye	Barley	Oats	Corn	Total for Five Cereals
Great Britain and Ireland	216,000	.....	48,200	62,300	80,700	407,200
France	43,700	3,100	6,000	27,900	19,700	100,400
Italy	53,300	800	900	7,800	14,600	77,400
Netherlands	22,000	11,400	11,000	7,800	21,700	73,900
Switzerland	16,900	800	900	11,700	3,900	34,200
Norway	3,700	10,200	4,600	500	1,200	20,300
Denmark	6,200	8,300	.....	4,500	11,800	30,800
Spain	6,200	.....	.....	.....	9,800	16,000
Sweden	7,000	3,900	.....	4,500	1,600	17,000
Egypt	7,700	.....	900	.....	400	9,000
Japan	4,000	.....	.....	.....	.....	4,000
Other Countries	98,100	16,100	(*a*) 11,900	.....	1,600	103,900
Totals	484,800	54,600	60,600	127,100	167,000	894,100

(*a*) Net exports.

TABLE II.—*Average Net Exports 1909-10 to 1913-14.*

(Thousands of bushels)

Countries	Wheat	Rye	Barley	Oats	Corn	Total for Five Cereals
Argentina	(*b*) 83,000	400	900	38,900	124,800	248,000
United States	106,900	800	8,300	3,900	36,200	156,100
Canada	94,800	.....	5,500	15,600	(*a*) 10,600	105,300
Australia	(*b*) 53,300	.....	.....	.....	(*a*) 400	52,900
India	(*c*) 49,600	.....	.....	.....	.....	49,600
Algeria	5,100	.....	5,000	3,900	(*a*) 400	13,600
Chili	1,100	.....	900	2,600	.....	4,600
Tunis	(*a*) 700	.....	2,800	2,600	(*a*) 400	4,300
New Zealand	400	.....	.....	1,300	.....	1,700
Uruguay	700	.....	.....	.....	.....	700
Totals	394,200	1,200	23,400	68,800	149,200	636,800

(*a*) Net imports.
(*b*) Years 1909-13.
(*c*) April 1st to March 31st.

TABLE III.—*Average Net Imports and Exports of Countries Closed to Commerce 1909-10 to 1913-14*

(Thousands of Bushels)

Countries	Wheat	Rye	Barley	Oats	Corn	Total for Five Cereals
Net Imports						
Germany	68,300	(*a*) 26,400	149,300	3,200	31,900	226,300
Belgium	49,200	4,700	15,100	7,800	17,300	94,100
Austria-Hungary	10,700	(*a*) 1,200	(*a*) 7,400	1,900	15,000	19,000
Total imports	128,200	(*a*) 22,900	157,000	12,900	64,200	339,400
Net exports.						
Russia	164,200	27,900	173,200	65,500	28,000	458,800
Roumania	53,600	3,900	17,900	9,100	44,900	129,400
Bulgaria	11,000	2,000	1,800	.....	9,100	23,900
Total exports	228,800	33,800	192,900	74,600	82,000	612,100

(*a*) Net exports.

For the five cereals collectively the pre-war average net imports were 1,233,500,000 bushels and the pre-war net exports were 1,248,900,000. For the open countries the average net imports were 894,100,000 bushels, while the average net exports were 636,800,000; so that before the war the importing countries, at present open to trade, obtained 257,300,000 bushels of their requirements from countries as yet closed to trade, viz.: Russia, Roumania and Bulgaria. Of the closed countries Germany, Belgium and Austria-Hungary required from abroad 339,400,000 bushels, and the exports from Russia, Roumania and Bulgaria were sufficient to supply this demand and to furnish 257,000,000 bushels of the supplies required by the open countries, besides what was imported from overseas. If production and consumption had remained the same as they were on the average of the five years before the war, the importing open countries would now be 257,000,000 bushels per annum short of their requirements of these five cereals taken together. This shortage has since had to be made up by larger importations from overseas.

Of course Belgium will, as before the war, obtain the bulk of her 50 million bushels of wheat from this side of the Atlantic, but, from the data which will be adduced later, it will appear that the 339 million bushels, even if available between now and August 1st next for export from Russia and the Balkans, will be far from furnishing the normal supplies formerly needed by the central German States. Since Russia's collapse in 1917 the Germans have made strenuous efforts to restore normal import conditions. The dislocation and civil strife arising from Bolshevism in Russia are interfering with production and retarding that restoration. The Germans can probably buy their supplies from that source more profitably that elsewhere, because they have manufactured products to sell which the Russians badly need. Through such reciprocal trade they would overcome the handicap presented by the worthless Russian currency and lack of gold. The return cargo on the grain carrying trains would facilitate the transportation problem. They would thus strive to regain their former economic supremacy. They would work to that end with all the more energy and determination because of the hate of the Allies and because of the disinclination of the Allies to trade with them and especially to supply them with the food which they now claim they urgently need. On the other hand, the Southern Russians and the Ukranians in particular can reach Western European markets through the Port of Odessa and the Dardenelles, and it is not improbable that they will by this route export considerable quantities of cereals from next season's crops. It is improbable that any considerable quantity will be available from stored grains for immediate shipment.

In the pre-war period the closed importing countries produced an annual average of 2,407,500,000 bushels of the five cereals. Their average annual imports for the same period were 339,400,000 bushels (Table III) making their total annual average consumption 2,746,900,000. Observe the preponderance of the rye crop shown in Table IV. especially for Germany and Russia. Now will naturally follow a comparison of the preceding data with those of 1917-18 in so far as these are now available. Table V gives the net exports of the exporting countries open to commerce.

TABLE IV.—*Average yield for the five years ending 1913.*

(Thousands of bushels)

Recent statistics are not yet available for the closed countries, but their pre-war average yield of these five cereals was as follows:—

Closed countries	Wheat	Rye	Barley	Oats	Corn	Total Five Cereals
Importing Countries						
Germany	150.900	444.900	151.600	557.600	.....	1,305.000
Belgium	14.700	23.600	4.600	38.900	27.600	109.400
Austria Hungary	231·500	161·400	151·600	239·900	208·700	993·100
Total	397·100	629·900	307·800	836·400	236·300	2,407·500
Exporting countries						
Russia	815·700	921·200	505·200	1,024·500	86·600	3,353·200
Roumania	88·200	3·900	23·000	26·000	106·300	247·400
Bulgaria	44·100	7·900	13·800	6·500	.....	72·300
Total	948·000	933·000	542·000	1,057·000	192·900	3,672·900
Grand total	1,345·100	1,562·900	849·800	1,893·400	429·200	6,080·400

TABLE V.—*Total Exports, 1917-18*

(Thousands of Bushels.)

Countries	Wheat	Rye	Barley	Oats	Corn	Total for Five Cereals
Argentina	84,464	.....	565	17,617	35,191	137,837
United States	135,314	12,540	27,654	111,197	38,793	325,498
Canada	169,040	1,114	6,635	39,826	(*a*)7,004	209,611
Australia	38,224	.....	.....	.....	.....	38,224
India	14,008	.....	.....	.....	.....	14,008
Algeria	2,054	.....	1,757	5,233	4	9,048
Totals	443,104	13,654	36,611	173,873	66,984	734,226

(*a*) Net imports.

For the cereals other than wheat the figures for Argentina and Australia refer to the calendar year, and those for India to the year ending March 31st.

TABLE V*a*—*Monthly Exports of Wheat*

(Including Flour for Canada and United States)

(Thousands of bushels)

	Canada	United States	India	Australia	Argentina	Total for five Countries
1917–18						
August (1917)	18,698	9,739	3,004	8,164	720	40,325
September	6,154	7,182	1,724	4,236	1,600	20,896
October	17,174	11,483	860	3,080	928	33,525
November	29,191	10,614	600	1,852	2,048	44,305
December	33,756	15,315	1,020	2,532	1,856	54,479
January (1918)	8,491	12,442	612	2,260	2,904	26,709
February	9,574	10,502	688	2,004	3,080	25,848
March	13,500	12,208	1,224	3,000	8,160	38,092
April	11,074	12,364	840	2,144	13,992	40,414
May	7,567	10,915	1,000	2,360	12,380	34,222
June	8,614	11,373	1,272	3,392	16,212	40,863
July	5,247	11,177	1,164	3,200	20,584	41,372
Totals for 1917–18	169,040	135,314	14,008	38,224	84,464	441,050
1918–19						
August	3,790	19,496	1,172	3,620	19,004	47,082
September	3,541	28,347	900	2,980	6,640	42,402
October	8,324	24,531	1,012	2,772	4,504	41,143
November	7,023	.....	1,392	3,892	2,672	.....
Totals for 4 months	22,678	.....	4,476	13,264	32,820	
Totals for 4 months, 1917-18	71,217	39,018	6,188	17,332	5,296	139,051

Of the total average annual pre-war imports of 894,000,000 bushels (Table I) it has been shown that 636,800,000 were supplied by the present open countries (Table II). Table V shows how far these countries have been able to supply in 1917-18 the same quantities and make up the shortage of 257,000,000 that formerly came from Eastern Europe. The omission here of the lesser exporters: Chili, Tunis, New Zealand and Uruguay, for which data are not available, is unimportant. They only exported a pre-war average of 1,500,000 bushels of wheat and 11,300,000 of all five cereals. The same countries (Table II) in the pre-war period exported 636,800,000 bushels, against their export in 1917-18 of 734,000,000 (Table V), an increase of 97,000,000 bushels, being so much of a contribution towards making up the 257,000,000 previously supplied by Eastern Europe.

It is of paramount interest to compare with the actual exports shown above the imports actually recorded for the corresponding grain year 1917-18.

TABLE VI.—*Net Imports of Cereals, 1917–18*

(Thousands of Bushels)

Countries	Wheat	Rye	Barley	Oats	Corn	Total for five Cereals
Great Britain and Ireland	144,649	.....	20,434	45,590	35,018	245,691
France	76,170	1,130	7,900	32,590	8,653	126,443
Italy	67,450	2,716	5,704	21,216	7,732	104,818
Netherlands	702	20	46	156	913	1,837
Switzerland	3,597	559	335	2,847	1,114	8,452
Norway	3,219	2,027	1,254	.....	953	7,453
Spain	2,425	.....	46	.....	118	2,589
Sweden	2,025	413	322	.....	571	3,331
Egypt	647	.....	14	.....	(*a*) 94	567
Japan	(*a*)4,137	.....	23	.....	24	(*a*) 4,090
Totals	296,747	6,865	36,078	102,399	55,002	497,091

(*a*) Net exports.

TABLE VII.—*World's Production of Cereals*

Wheat

Countries	1918.	1917	Five years' average, 1909-13
	Bushels	Bushels	Bushels
United States	919,100,000 (*a*)	650,828,000	686,694,000
Canada	210,316,000 (*a*)	233,743,000	197,118,000
Mexico	8,000,000	8,480,000	8,000,000
Argentina	207,000,000 (*b*)	218,618,000	147,070,000
Uruguay	8,000,000	12,860,000	6,518,000
Denmark	5,100,000	4,300,000	5,344,000
France	228,000,000 (*b*)	144,151,000	317,639,000
Greece	8,000,000	4,000,000	4,320,000
Switzerland	7,095,000 (*a*)	4,556,000	3,314,000
Italy	176,372,000 (*a*)	137,613,000	183,336,000
Netherlands	4,500,000	4,586,000	4,896,000
Norway	265,000	241,000	306,000
Portugal	7,000,000	7,440,000	7,440,000
Cyprus and Malta	2,400,000	2,400,000	2,400,000
Spain	127,982,000 (*a*)	142,676,000	130,447,000
Sweden	6,900,000	6,871,000	7,769,000
Great Britain	86,500,000 (*a*)	59,750,000	58,043,000
Ireland	4,000,000	4,347,000	1,597,000
India	380,202,000 (*a*)	379,232,000	351,766,000
Japan	31,127,000 (*a*)	25,850,000	21,166,000
Algeria	35,000,000	28,980,000	34,998,000
Egypt	32,555,000 (*a*)	29,835,000	34,814,000
Tunis	9,406,000 (*a*)	6,963,000	6,230,000
Australia	70,000,000 (*b*)	122,584,000	90,500,000
New Zealand	6,000,000	6,276,000	7,070,000
Chili	12,000,000	12,000,000	21,246,000
Totals	2,592,820,000	2,259,180,000	2,340,041,000

(*a*) Official figures. (*b*) Broomhall's "Corn Trade News."

Figures for other countries for 1918 are estimates based on acreage and condition reports.

The total production of 1918 is 15 p.c. greater than that of 1917 and 11 p.c. greater than the pre-war five-year average.

In table VI it is shown that countries, which, before the war had been importing 894,000,000 bushels of these five cereals, have actually only received 497,000,000 or nearly 400,000,000 less. And, what is strange indeed, the actual receipts were 237 million bushels less than were exported. Although the exports to countries outside of Europe are in normal peace time quite large, comprising 98 million bushels of wheat alone, 237 million cannot in this period be accounted for as such exports.

If the actual imports, as shown in Table VI are any measure of those to follow in 1918-19, the prospects are disappointing for the exporting countries. The supplies of all the five cereals, except corn, are abundant in the exporting countries. Especially is this the case for wheat in Australia, Argentina and the United States. It is now opportune to examine these supplies, taking up first production in the years 1917 and 1918 with a pre-war comparison in the case of each cereal. It is unfortunate that except for wheat, the data for 1918 are not available for all the countries mentioned in the pre-war period, the figures for France being absent. Still the figures for France show a marked decrease for all cereals in 1917 and to a less degree in every year after the outbreak of war.

TABLE VIIa.—*Rye*

Countries	1918	1917	Five years' average 1909-13
	Bushels	Bushels	Bushels
Spain	31,853,000	24,203,000	27,600,000
Italy	4,724,000	4,334,000	5,500,000
Luxemburg	421,000	292,000	.....
Switzerland	1,850,000	1,752,000	2,000,000
Canada	10,376,000	3,857,000	2,400,000
United States	89,103,000	60,145,000	35,000,000
Totals	138,327,000	94,583,000	72,500,000(1)

(1) The total for 1918 shows an increase of 90% over that for 1909-13. The Canadian total is over four times and the United States twice as large.

TABLE VIIb.—*Barley*

Countries	1918	1917	Five years' average 1909-13
	Bushels	Bushels	Bushels
Spain	84,464,000	77,957,000	74,400,000
England and Wales	50,000,000	46,162,000	65,200,000(*a*)
Scotland	5,582,000	5,875,000	.....
Italy	9,186,000	7,422,000	10,100,000
Luxemburg	136,000	154,000	.....
Canada	83,263,000	55,058,000	42,700,000
Switzerland	666,000	712,000	500,000
United States	256,375,000	208,975,000	181,900,000
Egypt	9,870,000	13,598,000	11,900,000
Japan	76,053,000	95,750,000	97,800,000
Tunis	9,186,000	8,267,000	7,800,000
Totals	584,781,000	519,930,000	492,300,000

(*a*) Scotland included.

Here is an increase of nearly 100,000,000 bushels in the totals, in which Canada figures conspicuously having nearly doubled its production.

TABLE VIIc.—*Oats*

Countries	1918	1917	Five years' average 1909-13
	Bushels	Bushels	Bushels
Spain	29,113,000	31,116,000	27,200,000
England and Wales	124,000,000	99,719,000	194,500,000 (*a*)
Scotland	53,223,000	49,984,000	.....
Italy	38,907,000	31,345,000	35,000,000
Luxemburg	1,373,000	1,897,000	.....
Switzerland	4,882,000	4,331,000	4,600,000
Canada	456,734,000	403,010,000	326,200,000
United States	1,538,359,000	1,587,286,000	1,064,700,000
Tunis	3,631,000	3,761,000	3,200,000
Totals	2,250,222,000	2,212,449,000	1,655,400,000

(*a*) Scotland included.

Note the considerable increases in Canada, United States and England and Wales.

TABLE VIId.—*Corn*

Countries	1918	1917	Five years' average 1909-13
	Bushels	Bushels	Bushels
Spain	26,584,000	29,369,000	26,400,000
Switzerland	358,000	252,000	.....
Canada	6,946,000	7,763,000	16,900,000
United States	2,532,814,000	3,159,494,000	2,708,100,000
Totals	2,566,702,000	3,196,878,000	2,751,400,000

While the 1918 crop is 190 million bushels less than the pre-war average those for 1917-18 taken together exceed that average by 130 million bushels.

Data corresponding to those for cereals are not available for potatoes, but the following table will give an accurate idea of this crop in a few countries. Note the important increases in England and Wales and Canada, and the falling off of the French crop.

TABLE VIIe.—*Potatoes*

Countries	1918	1917	Five years' average 1912-16
	Bushels	Bushels	Bushels
France	275,578,000	401,340,000	426,285,000
England and Wales	153,000,000	124,693,000	103,018,000
Scotland	41,440,000	41,440,000	36,842,000
Luxemburg	4,731,000	5,925,000	6,201,000
Canada	105,580,000	79,892,000	74,550,000
United States	397,676,000	442,336,000	361,753,000
Totals	978,005,000	1,095,626,000	1,008,649,000

Rice.

The yield of rice in 1917 in Spain, Italy, United States, India, Japan, and Egypt was 2,264,122,000 bushels, compared with an annual average of 2,838,635,000 during the five years 1911-15. The production of the United States, Italy and Spain in 1918 was 78,053,000 bushels compared with a five years average of 60,363,000 bushels.

Recapitulation of the preceding Tables VII to VIId, relating to the production of wheat, rye, barley, oats and corn.

——	1918 Thousands of bushels	1917 Thousands of bushels	Average 1909-13 Thousands of bushels
Wheat	2,592,820	2,259,180	2,340,041
Rye	138,327	94,583	72,500
Barley	584,781	519,930	492,300
Oats	2,250,222	2,212,449	1,655,400
Corn	2,566,702	3,196,878	2,751,400
Totals	8,132,852	8,283,020	7,311,641
Totals less corn	5,566,150	5,086,142	4,560,241

In this recapitulation the data for each one of the cereals does not cover the same number of countries as the others, but only the same years. Therefore the addition of them does not furnish a total of any value except to show for the particular years a tendency to increase in the later over the earlier years. The United States corn crop, which is in effect the world's crop, here swells the figures for 1917 and depresses the figures for 1918. Still the latter show an increase of 10 per cent over the pre-war figures. If corn be removed from the above aggregate totals, the production for 1918 will stand 20 per cent larger than that of the pre-war average and 7½ per cent larger than that of 1917.

When the details of the various tables VII are examined wide differences are found. The notable increases in acreage and production in the United States and Canada will be referred to later; attention is now directed to the aggregate production of wheat, which for 1918 exceeded the pre-war average by 11 per cent. Argentina's corresponding increase for wheat is 40 per cent, Great Britain's increase for wheat is also 40 per cent, and for oats 37, per cent.

Here is presented, in comparison with the pre-war period, a bird's eye view of the acreage and production in 1917—when data were available for a larger number of countries for each cereal than in 1918—percentages only being given.

Products	Acreage of 1917 compared with five year average 1909-13	Production of 1917 compared with five year average 1909-13	Number of countries on which estimates are based.
	%	%	
Rye	103·4	89·2	12
Barley	104·2	100·3	18
Oats	113·0	123·5	17
Corn	114·5	115·1	7

The decreases are altogether in European countries, the American Continent and Australasia recording increases in all cereals. France and Italy were the worst sufferers, as the following statement shows:

Products	France		Italy	
	Thousands of bushels		Thousands of bushels	
	1917	Average 1909-13	1917	Average 1909-13
Wheat	144,151	317,639	137,613	183,336
Rye	27,509	49,025	4,460	5,330
Oats	223,461	334,383	31,896	34,775
Barley	39,557	48,185	7,422	10,105
Potatoes	401,340	484,965	55,116	60,807
Totals	836,018	1,234,197	236,507	294,353

Thus France's production was 47½ per cent, and Italy's 20 per cent less than pre-war

production. For 1918, the only data available relate to wheat, and show Italy's yield to be only slightly under normal, and France's to be 60 per cent of pre-war, against over 100 per cent as it stood in 1917.

This result of the war upon production especially in France, seems to offer a plausible basis for the formation of an estimate of the crops of the central empires, which have not reported to the Institute since 1914. Apply to these countries a somewhat less reduction, say 40 per cent and there can be formed from the following table some idea of the central empire requirements, including those of Belgium which probably fared worse.

TABLE VIII

	Average Production. 1909–13	Average imports, 1909–10 to 1913–14	Average Consumption 1909–10 to 1913–14	Estimated Production 1918	Estimated import requirements 1918–19
		Thousands of Bushels.			
WHEAT—					
Germany	152,859	68,343	221,197	91,859	129,338
Austria-Hungary	230,750	10,288	241,039	138,450	102,588
Belgium	14,896	49,200	64,096	8,938	55,158
Totals	398,505	127,831	526,332	239,247	287,084
RYE—					
Germany	445,225	(*a*)26,400	418,825	267,135	151,690
Austria-Hungary	161,876	(*a*) 1,200	160,676	97,136	63,540
Belgium	22,675	4,700	27,375	13,605	13,770
Totals	629,776	(*a*) 22,900	606,876	377,876	229,000
BARLEY—					
Germany	153,531	149,300	302,831	92,119	210,712
Austria-Hungary	147,660	(*a*) 7,400	140,260	88,596	51,664
Belgium	4,247	15,100	19,347	2,548	16,799
Totals	305,438	157,000	462,438	183,263	279,175
OATS—					
Germany	557,600	3,200	560,800	334,305	226,495
Belgium	38,900	7,800	46,700	21,213	25,487
Austria-Hungary	239,900	1,900	241,800	143,441	98,359
Totals	836,400	12,900	849,300	498,959	350,341
CORN—					
Germany	.....	31,900	31,900	.....	31,900
Belgium	27,600	17,300	44,900	16,560	28,340
Austria-Hungary	208,700	15,000	223,700	125,420	98,280
Totals	236,300	64,200	300,500	141,980	158,520
RECAPITULATION—					
Wheat	398,505	127,831	526,332	239,247	287,084
Rye	629,776	(*a*) 22,900	606,876	377,876	229,000
Barley	305,438	157,000	462,438	183,263	279,175
Oats	836,400	12,900	849,300	498,959	350,341
Corn	236,300	64,200	300,500	141,980	158,520
Grand totals	2,406,419	339,031	2,745,446	1,441,325	1,304,120

(*a*) Net exports.

We have not considered root crops which in France suffered a greater loss than the cereals; and which for the same reasons: lack of labour, fertilizers, and motor fuels, must have suffered even more in the enemy countries. Germany alone produced a pre-war average of no less than 1,682,000,000 bushels of potatoes. Oats have no doubt been used less for horses and more for other live stock and human food, being to some extent replaced, as in the more Western countries, by dried brewers' grains, rice meal, etc. Taking the five cereals together, assuming the consumption of the people to have reverted to the pre-war normal, there would need to be an import of no less than 1,304,120,000 bushels of the five cereals, against a pre-war-average import of 339,000,000 bushels.

Whether the assumed 40 per cent reduction is too great or not, it should be recalled that just now, only three months after the completion of their harvest, bitter complaints of starvation conditions are heard from our enemies. No doubt the animal shortage is more serious than the cereal, and this is also an important factor in the situation. From the meagre reports that have been received the situation is little if any better in the Balkan nations, including Roumania. So

any exports of cereals that might be spared from the Ukraine and other parts of Russia, would scarcely cover more than the urgent needs of contiguous territories.

In 1918-19 it devolves once more on this continent, Australasia and India to supply the great demand. India has such poor prospects for the next harvest in April, that apart from a modest contribution from this year's crop, she will not be an important factor. Australasia and Argentina will depend on improved shipping facilities to get their superabundant supplies to market. The fact to be watched is whether the comparatively low prices will not attract the ships. It therefore behooves the producers of cereals in North America to make a careful survey, not only of European requirements, but of their own sources of supply. Hence the synoptic review here presented of acreage and production in Canada and the United States.

TABLE IX.—*Acreage of Crops in Canada.*

Crop.	1918	1917	1916	1914	Five years' average 1910–14	1918 compared with five years' average
						%
Wheat	17,354,000	14,756,000	15,370,000	10,294,000	10,454,000	166·0
Oats	14,790,000	13,313,000	10,996,000	10,062,000	9,749,000	151·7
Barley	3,154,000	2,392,000	1,803,000	1,496,000	1,500,000	210·3
Rye	555,000	212,000	148,000	111,000	121,000	458·7
Buckwheat	548,000	396,000	342,000	354,000	373,000	146·7
Corn for husking	250,000	234,000	173,000	256,000	290,000	86·2
Total Cereals	36,651,000	31,303,000	28,832,000	22,573,000	22,487,000	163·0
Potatoes	735,000	657,000	473,000	476,000	476,000	154·4
Hay	10,545,000	8,225,000	7,821,000	7,997,000	8,268,000	127·5
Corn for fodder	515,000	366,000	293,000	317,000	302,000	170·5

TABLE IX*a*.—*Production of Crops in Canada.*

Crop.	1918	1917	1916	1914	Five years' average, 1910–14	1918 compared with five years' average
	Bushels	Bushels	Bushels	Bushels	Bushels	%
Wheat	210,315,000	233,743,000	262,781,000	161,280,000	196,026,000	107·3
Oats	456,734,000	403,010,000	410,211,000	313,078,000	343,612,000	132·9
Barley	83,263,000	55,058,000	42,770,000	36,201,000	41,436,000	200·9
Rye	10,376,000	3,857,000	2,876,000	2,017,000	2,155,000	481·5
Buckwheat	11,470,000	7,149,000	5,976,000	8,626,000	8,631,000	132·9
Corn for husking	6,946,000	7,763,000	6,282,000	13,924,000	16,231,000	42,8
Total cereals	779,104,000	710,580,000	730,896,000	535,126,000	608,091,000	128·1
Potatoes	105,580,000	79,892,000	63,297,000	85,672,000	75,190,000	128·1
Corn for Fodder	.....	2,690,000 Tons	1,908,000 Tons	3,251,000 Tons	2,856,000 Tons	
Hay	.....	13,685,000	14,527,000	10,259,000	11,706,000	

TABLE X.—*Acreage of Crops in United States.*

Crop	1918	1917	1916	1914	Five years' average 1910–14	1918 compared with five years' average
						%
Corn	113,835,000	119,755,000	105,296,000	103,435,000	105,240,000	108·2
Wheat	64,659,000	59,045,000	56,810,000	54,661,000	52,452,000	123·3
Oats	44,475,000	43,572,000	41,527,000	38,442,000	38,014,000	117·0
Barley	9,108,000	8,835,000	7,757,000	7,565,000	7,593,000	120·0
Rye	6,119,000	4,480,000	3,474,000	2,733,000	2,562,000	238·8
Buckwheat	1,945,000	1,006,000	828,000	792,000	826,000	126,5
Total Cereals	239,241,000	236,693,000	215,692,000	207,628,000	206,687,000	115·7
Potatoes	4,113,000	4,390,000	3,565,000	3,711,000	3,686,000	111·6
Hay	53,386,000	53,516,000	55,721,000	49,145,000	49,357,000	108·2

TABLE Xb.—*Production of crops in the United States.*

Crops	1918	1917	1916	1914	Five years' average 1910-14	1918 compared with five years' average
	Bushels	Bushels ;	Bushels	Bushels	Bushels	%
Corn	2,532,814,000	3,159,494,000	2,566,927,000	2,672,804,000	2,732,457,000	92·7
Wheat	919,100,000	650,828,000	636,318,000	891,017,000	728,225,000	125,9
Oats	1,538,359,000	1,587,286,000	1,251,837,000	1,141,060,000	1,157,961,000	132·9
Barley	256,375,000	208,975,000	182,309,000	194,953,000	186,208,000	137,7
Rye	89,103,000	60,145,000	48,862,000	42,779,000	37,568,000	237,0
Buckwheat	17,182,000	17,460,000	11,662,000	16,881,000	17,022,000	100·9
Total Cereals	5,352,933,000	5,684,188,000	4,697,915,000	4,959,494,000	4,859,441,000	110·1
Potatoes	397,676,000	442,536,000	286,953,000	409,921,000	360,772,000	101,2
	Tons	Tons	Tons	Tons	Tons	
Hay	71,555,000	79,528,000	91,192,000	70,071,000	66,234,000	108·0

The United States Winter Cereals 1918-19.

The largest winter wheat crop ever grown in the history of the United States is promised by the enormous acreage sown this fall. The acreage is almost 16 per cent larger than last year's and totals 49,027,000 acres. A total crop of 765,000,000 bushels is forecasted, or 80,000,000 bushels more than the record crop of 1914, which amounted to 684,998,000 bushels. Last year's crop was 558,449,000 bushels.

The condition of the crop on December 1st was 98·5 per cent of a normal, compared with 79·3 a year ago, 85·71 in 1916, and a ten-year average of 88·2.

The area sown to rye is 6,820,000 acres which is 1·7 per cent more than the revised estimated area sown in the fall of 1917, which was 6,708,000 acres.

The condition of the rye crop on December 1st was 89·0 per cent of a normal, compared with 84·1 a year ago, 88·8 in 1916, and a ten-year average of 91·4.

Wheat Supply and Demand, August 1st, 1918 to August 1st, 1919.

The good wheat crops in Great Britain and Italy and comparatively good ones in France, have somewhat relieved the urgent demand in Europe. That demand is much more urgent in the neutral and enemy countries and is difficult to estimate. The following estimates are based on the average pre-war consumption. The estimated importing requirements added to this year's crop for each country furnish the total estimated consumption for the current year, shown in the second column.

Countries	Estimated Requirements	Total supply for 1918-19	Pre-War average consumption
	Bushels	Bushels	Bushels
France	90,000	317,639	317,639
Great Britain	180,000	267,200	275,578
Italy	50,000	226,000	236,000
Greece and Serbia	25,000	.....	.....
Spain and Portugal	6,000	136,000	146,000
Belgium	50,000	159,000	164,000
Scandinavia and other European neutrals	50,000	73,000	78,000
Germany	80,000	161,859	221,197
Austria Hungary	20,000	158,450	241,039
Egypt, Palestine and Mesopotamia	20,000	.....	.....
Outside Europe	80,000	277,000	357,000

World's Requirements: 651,000

Making a fair allowance for stocks which will be left over on August 1st next, an estimated statement is here presented of the supplies of wheat available for export, and of the shipments which might be made within the year, shipping facilities permitting. The carry-over from the grain year 1917-18 has been added to the current crop and 5 per cent has been deducted from the United States crop for screenings and waste wheat which cannot be marketed. 10 per cent has been deducted from the Canadian crop because the low grading of the crop so far reported would indicate that a large allowance should be made for unmerchantable wheat.

Countries	Net Merchantable stocks August 1, 1918	Food and Seed	Carryover August 1st 1919	Probable Export
	Thousands of Bushels	Thousands of Bushels	Thousands of Bushels	Thousands of Bushels
Canada.....	197,000	77,000	5,000	115,000
United States..	898,000	600,000	23,000	275,000
Argentina.....	261,000	70,000	61,000	130,000
Australia.....	200,000	40,000	50,000	110,000
India.....	380,000	320,000	40,000	20,000
Totals.....	1,936,000	1,107,000	179,000	650,000

See table V.

It would only be through Governments favouring export and import to the utmost limit that 650 million bushels could be exported by August 1st next. Price concessions by Australia and Argentina might abnormally stimulate shipments from these countries.

As to the prospects of shipping facilities, Mr. Geo. Broomhall makes the following interesting statement in the Corn Trade News of December 10th inst.

We may well rest assured that as regards actual supplies of wheat, there is no lack, even supposing that Germany and Austria be granted a share of what there is to spare, but what of ocean-carriers to bring the breadstuffs and feeding grain? The latest official statement on the tonnage situation is very reassuring on this point, and clearly indicates that before the year 1919 is very far advanced, the World's merchant fleet will be as large as it was previous to the war. We do not think that a mercantile fleet on a pre-war basis will mean an abundant supply of tonnage for all needs, because a number of ships may still be wanted for military purposes, whilst importers may need abnormally large supplies of food and raw materials, of which a larger proportion than usual will have to be brought from distant lands, owing to lack of Russian and Roumanian supplies, but, anyway, the general position will have vastly improved, and it will continue to grow steadily better.

Taking a longer view of the shipping situation, we may pause a moment to consider what will be the position when the World's shipbuilders have actually put afloat sufficient tonnage to make good all the war-time losses. As already said, this will happen early next year, but when the losses are made good the output of 600,000 tons per month will, as far as one can see at present, continue to be maintained. It follows as a matter of course that with this rate of construction the total mercantile fleet of the world will very soon become enormous. When this happens, are we to expect that freights will fall to a level as low as they have ever been?—and we may remind our readers that at one time the rate for grain to Liverpool from New York was less than ½d. per bushel. Will there be an international agreement to limit construction? And, if so, how will it be enforced? Will the chief coal-producing nations, namely the United Kingdom and the United States, be able to come to an agreement, and, having done so, will they be able to induce the smaller countries to conform to the regulations which they have established? Many of these smaller nations own no coal at all, so they will probably be amenable to direction from the big coal owners. But will this not be an interference with the freedom which it is desired to assure to all small nations? The position, as we view it, is certainly fraught with great difficulties and great possibilities—the difficulty of stopping work in a number of big shipbuilding yards, and thereby throwing thousands of men out of employment is not one to be lightly regarded; on the other hand, the possibility of cheap freights is an alluring one, especially for countries situated as we are. We may give as an instance, the facilities that cheap freights would give to us for obtaining cheap maize from Argentina. There is a large stock of old corn in that country, and the present good prospects for the new crop make it probable that in 1919 there will be some 215,000,000 bushels of this cereal on hand and available for shipment, and supposing that really low freights could be obtained, there is the possibility that this maize could be brought to our country and sold here at 72 cents per bushel or less, and other staple articles in proportion, we say nothing of wheat, for the Governmental guarantees of minimum prices in this country and in the States remove that cereal, for a long time to come, outside the sphere and operation of natural economic laws.

Ocean Freight Rates.

What has been the course of ocean freight rates, to which Mr. Broomhall has just alluded? The following statement furnishes the reply. It appears that North America is no longer favoured by the wide difference in rates as between North Atlantic and Argentine ports.

CENTS PER BUSHEL

Date	New York to Liverpool	India to Liverpool	Argentina to Liverpoo	Australia to Liverpool
Average of 5 year's ending				
1913	4·8	10·9	8·6	(a) 17·0
July 1914.....	5·3	7·9	6·9	(a) 12·2
Jan. 1915.....	20·5	21·3	40·8	.....
Jan. 1916.....	40·6	68·4	91·2	(a) 48·9
Jan. 1917.....	29	88	83	79
Jan. 1918.....	32	1·63	1·30	85
July 1918.....	32	1·63	1·34	71
Dec. 1918.....	36	49	41	65 to 80

(a) sailing ships.

Concluding Observations.

From the review of the situation made in the present article, some misgivings may be entertained as to the maintenance of the present high prices of cereals. Circumstances may compel somewhat lower prices from one to three years hence; but the movement of the prices of wheat after all the great wars, from and including the Napoleonic wars to recent times, justifies the expectation that prices will continue relatively high for a long time to come. This question has been fully discussed by the writer in an article published in the "Bulletin of Foreign Agricultural Intelligence" of February 1916 (p. 163 et seq.); and also in an article entitled "Wheat Prospects after the War," published in the "Agricultural Gazette" of July 1917 (pp. 638-641).

Without detracting from the interest which Canadian farmers have in growing cereal crops, there appears justification for now inviting the attention, if but briefly, to the live stock situation, as connected with their cereal interests, in order to show that, whatever quantities of cereals they may produce they may market to the greatest advantage in the form of a more highly finished and profitable product. The live stock shortage of Europe at the present moment must be largely replenished from this continent, but there is an even more alluring prospect in the growing U.S. demand which can no longer be supplied by domestic stock. From the following synoptic statement of the numbers of live stock on this continent with reference to population, it appears that the United States will, in the near future, be more and more dependent on Canadian production.

TABLE XI.—*Population Compared with Numbers of Live Stock*

UNITED STATES—(000 omitted).

——	1900	1905	1910	1914	1915	1916	1917	1918
Population	76,000	84,084	92,174	98,646	100,264	101,882	103,500	104,309
Cattle	67,720	61,241	63,683	66,592	58,329	61,920	64,583	66,830
Swine	37,079	47,320	59,474	58,933	64,618	67,766	67,503	71,374
Sheep	41,883	45,170	52,839	49,719	49,956	48,625	47,616	48,900

In 1918 the population of the United States was 37·2 per cent greater than in 1900. Between the same years the number of cattle decreased by 1·3 per cent, swine increased 92·5 per cent and sheep increased 16·7 per cent.

CANADA—(000 omitted)

——	1901	1911	1914	1915	1916	1917	1918
Population	5,371	7,206	.....	8,075	8,136	.....	.....
Cattle	5,576	6,586	6,037	6,066	6,594	7,920	10,051
Swine	2,354	3,634	3,434	3,112	3,474	3,619	4,290
Sheep	2,510	2,174	2,058	2,039	2,023	2,369	3,053

In 1916 the population of Canada was 51·5 per cent greater than in 1901. Between 1901 and 1918 the number of cattle increased by 80·3 per cent, swine 82·2 per cent, and sheep by 21·6 per cent.

It appears from the statistical tables presented herein that the production in Canada of the coarser cereals has progressed more rapidly than the production of wheat. This is remarkable in view of the fact that the Government has fixed a price for wheat for the purpose of stimulating its production. Oats, for instance, which, from the earlier Canadian censuses, seems to have been used almost exclusively for horse feed has in recent years been extensively fed to live stock and with other coarse cereals to a great extent fills the place in Canada so conspicuously filled by the corn crop in the United States. This shows that the Canadian farmer realizes the considerable profit resulting from feeding these cereals. Nor need they be anxious this season about their unmerchantable wheat. There is in the Weekly News Letter of the United States Department of Agriculture, February 17, 1915, the following statement with reference to the feeding of wheat to swine:

> "Chief among the small grains is wheat, and it appears to be the food best adapted for long-continued hog feeding. . . . . A bushel of wheat properly fed to reasonably well-bred hogs should produce approximately 13 pounds of gain in weight. The

results of a number of feeding tests show that there is comparatively little difference in feeding value between wheat and corn for swine. In comparing various rations in which corn, wheat and rye were fed alone or in combination with each other, it was found that dry, ground wheat gave the greatest returns and required the least amount of grain to make 100 pounds of gain. Wheat should be ground and mixed with some supplement, such as tankage, peas, or soy-bean meal. The results obtained from a number of tests have proved this to be a good practice."

This American view has been confirmed by an expert of the Live Stock Branch of our own Department of Agriculture. It is interesting in conclusion to note that at the rate of 13 lbs. of gain in weight per bushel of wheat fed to hogs with the price of hogs at $17 per cwt. the price yield per bushel of wheat fed would be $2.21, which is actually the Government price for No. 1 Northern Wheat delivered at Fort William.

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